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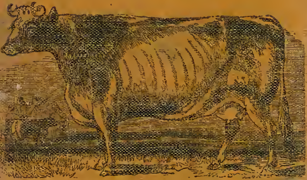

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CATTLE;

THEIR

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PREFACE.

The lapse of time since the first publication of this little work (though brief in itself) has rendered a revision and some additions necessary, because, so great have been the improvements in the breeding of stock, and so extended the localities in which the improved breeds have established themselves, that the descriptions even of a few years back have become erroneous.

For this rapid extension of late years we are chiefly indebted to the exertions of, and prizes awarded by, our Agricultural Societies, and chiefly to the Royal Agricultural Society of England.

Doubtless the best breeds of cattle are still found in great number and perfection in those counties and districts from which they derive their names; but they have now extended themselves so much beyond as to diminish—in some instances to extirpate—and, by crossing, materially alter the character of—the old loca varieties.

And not only this, but the names and localities of the more celebrated breeders of improved cattle have, within a few years, in many instances, changed. Thus, taking the Short-horns, which have had the greatest influence in improving our old breeds: while the men who originated this variety, and made it famous under the name of "Durham," are departed, the breed itself has extended not only over the British Isles, but far beyond; and Stratton, in Gloucestershire, and Watson, in Scotland, not to name many other celebrated breeders, have assisted in widely disseminating this once local variety. Indeed, the improved short-horns have now obtained a world-wide reputation; shipments of high priced animals being made to most of the European countries, as well as America and Australia.

North Devon is still famous for its breed of cattle; yet, as the Smithfield Shows often prove, the extreme east of England (as the earl of Leicester, in Norfolk) can bear off the palm from the extreme west.

The addition of the Appendix on Cattle Murrain appeared necessary, affecting, as this disease does, the interests of the consumer and breeder to so great an extent—the *consumer* primarily, from the risk of purchasing the milk or flesh of diseased animals (which, to say the least of it, must be less nutritious and wholesome than that of sound ones); and, secondly, in the increased price for meat which these fatal epidemics necessarily produce—the *breeder*, not only by the direct loss sustained from the disease itself, but also from the obstruction it causes to the purchasing or selling at public markets, from the dread of introducing such a fatal and contagious malady among his own animals.

For these reasons I have entered at so great a length on the subject, and have endeavoured to show plainly what both the consumer and breeder have to fear and guard against, and what preventive and curative means have been considered most efficacious in checking the disease, and in counteracting the evils produced by it.

W. R.

November 16*th*, 1857.

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CATTLE:

THEIR BREEDS, MANAGEMENT, DISEASES, &c.

CHAPTER I.

THE BREEDS OF CATTLE.

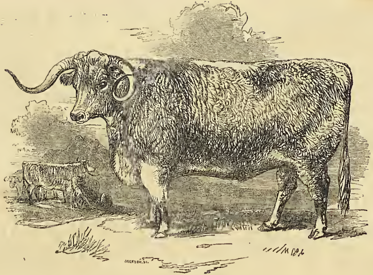
In no part of the world has so much capital and so much skill been expended in the improvement of horned cattle, as in Great Britain. We speak of recent times; for formerly it was not so: our agriculture was bad, our farming operations conducted on no principles, and our management of cattle was in accordance with the rest. Setting aside the now common culinary herbs of the garden, we knew nothing of the various plants, lucern, sainfoin, clover, and others, termed artificial grasses. Nor was the cultivation of turnips, or mangel-wurzel, and similar vegetables, in extensive operation. In fact, we had not wherewith to feed cattle in winter, and the art of stalling was not imagined. "The roast beef of old England," partial as we have ever been, as a nation, to this sort of animal diet, was a very different thing to the roast beef of the present day; and then, it was not the diet of the middle or lower classes,—the wealthy alone could procure it, and that only during the summer, while the cattle fed in the pastures, and throve on the natural herbage; but, in October and November, cattle were slaughtered for winter consumption; the carcass was cut up, and put into brine, and during that season nothing but salt meat could be obtained—we mean by those who could afford to purchase it. Salt fish was the ordinary or staple animal food of the lower classes; and from this, and the want of fruits, roots, greens, legumes, &c., dreadful diseases were engendered, and (as cleanliness was out of the question) became perpetuated; now smouldering, and now, the season of the year concurring, breaking out and depopulating towns, villages, and hamlets. We are not speaking of remote times, but of comparatively recent periods. "Three or four centuries ago," says Gilbert White, "before there were any inclosures, sown grasses, field turnips, or hay, all the cattle that had grown fat in summer, and were not killed for winter use, were turned out soon after Michaelmas, to shift as they could through the dead months, so that no fresh meat could be had in winter or spring. Hence the marvellous account of the stores of salted flesh found in the larder of the eldest Spencer, in the days of Edward the Second, even so late in the spring as the third of May (viz. six hundred boars, eight carcasses of beef, and six hundred of sheep). It was from magazines like these that the turbulent barons supported in idleness their riotous swarm of retainers, ready for any disorder or mischief. But agriculture is now arrived at such a pitch of perfection that our best and fattest meats are killed in winter; and no man needs eat salted flesh, unless he prefer it, that has money to buy fresh." But there were thousands, the serfs of the soil, who had no money to buy either salted or fresh meat, and a little reflection will serve to show what their condition must have been in the olden time of Merry England, had not the religious establishments, the abbeys and priories, on which it is now the fashion to pour obloquy, expended their revenues for the good of the district—for the benefit of the poor and the starving.

Agriculture, at this period, was in a rude state; whole tracts, now under the plough, were then undrained bogs or morasses, or rough woodlands, concealing a thin and barbarous population. Take, as an example, the Weald of Kent, formerly a wild, uncultivated forest; roads were few, and none good, and pack-horses were the ordinary means of carrying on internal commerce. The implements of husbandry were rude; no provision, or but little, was made for cattle during the winter months; nor were systematic attempts at elevating the breeds undertaken by the farmer. We are not, however, to suppose that no good breeds of cattle existed; England is essentially a corn-growing and a grazing country; and her green pasture lands, her verdant meadows, and fertile vales, watered by streams or rivers, have ever nourished herds of kine; our humid climate and cloudy skies are favourable to the production of grasses, clothing the fields with verdure. As the woods disappeared, and the marshes were drained, the extent of pasturage increased; the operations of farming began to be conducted on a better plan; the cattle began also to improve; from differences of situation and pasture, or from accidental or intentional intermixture, the old stocks soon assumed new characteristics, and ramified into breeds varying in minor details, though still preserving their outstanding characters. Of these some were of great value from the abundance of milk, others from their tendency to fatten and keep in condition, even on inferior pasture grounds; and others from their strength and hardiness as working steers. Mixtures of these breeds produced others, and thus varieties were ever springing up, and coalescing, or running into each other by imperceptible gradations, till at length, somewhat after the middle of the last century, science and experience were called in to the breeder's aid; and persevering patience and great pecuniary outlay were ultimately productive of the most beneficial results.

Looking at the cattle of Great Britain as a whole, we may justly regard them as unequalled by any country in the world, whether we take into consideration quantity or quality of milk, quality of flesh, its fineness of grain, a tendency to the acquisition of fat, or points of symmetry, all, in fact, that the dairy farmer, be his produce butter or cheese, all that the grazier for the market can wish for; the cattle of our islands are pre-eminent. Nor is this to be wondered at—climate, production, enterprise, skill, and money combine their agencies. There is, besides, a spirit of emulation, and agricultural societies, under the patronage of the nobles, themselves competitors for the prize, tend to the advancement of the great object—the improvement of domestic cattle.

Until the introduction of the Improved Short-horns, the general breed of the midland counties was a long-horned variety that had been brought to great perfection by Bakewell, who formed what he termed the new Leicester breed of long-horns; they are now rarely to be seen in England, being superseded by the short-horns: in Ireland they still prevail, although the farmers of that country are beginning to cross them with other and more valuable breeds.

These long-horned cattle were characterized by many good points, they were large and long bodied, the hide was thick and mellow; they were, however, coarse in the bone; and generally the milk from the cows was not abundant, although of rich quality. Their huge horns generally swept in a curve downwards, and sometimes met before the muzzle in such a manner that the points were obliged to be sawn off, in order that the animal might be at liberty to feed. In other instances



THE LONG-HORNED OX.

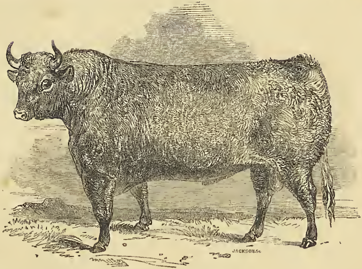
the horns took a lateral direction, first sweeping horizontally outwards, and then curving gently forwards.

It was in the course of a few years, comparatively speaking, that the long-horned breed attained to its perfection, and in as short a time it experienced a decline. The Dishley long-horns have run through their allotted date; perhaps they were bred too much in and in, a circumstance always tending to ultimate deterioration; perhaps, after the days of those who brought the long-horns to perfection, others came into the field with less skill, and, in attempting to improve, reversed the good that had been done: but more probable it is that the breed gave way before the rising dynasty of the improved short-horns, which now began to acquire the ascendancy. Rarely, indeed, in Lancashire, Leicestershire, or Westmoreland, are pure long-horned cattle to be seen; and it is the same in other counties where they once prevailed. Not that the traces of the improved long-horns are altogether effaced; in their palmy days they elevated the races of the midland counties, and though these, generally speaking, are now so mixed as to be of no definite breed, yet they were originally long-horns, and more or less influenced by the Dishley; they lost, to a greater or less degree, their original coarseness, and became permanently ameliorated.

For a long series of years Cheshire has been renowned as a dairy county, cheese being its noted product, and the cattle have been celebrated as milkers. They were originally long-horns of various crosses, and of little beauty, being angular and ill-formed, with thin thighs, a wide loin, and a light forequarter; but the udder was large, and its veins very apparent, the belly deep, with prominent milk-veins. Some of these lean angular cows have been known to yield twenty-four quarts of milk per day, but only for a short time; the average is eight or ten quarts, of which four quarts return a pound of cheese, while it takes twelve or fourteen quarts for the production of a pound of butter. It is estimated that there are 100,000 cows in Cheshire, each of which gives two-and-a-half hundred weight of cheese in the course of the year, making an annual total of 1250 tons.

The purest Devonshire cattle are to be found in the northern portion of that county, bordering the Bristol Channel; such at least is the opinion of some, who regard the larger variety found in the south, as mixed with other breeds of inferior strain; but there is, perhaps, something of ultra-refinement in this view of the matter.

The Devonshire bull has the head small; the muzzle fine;

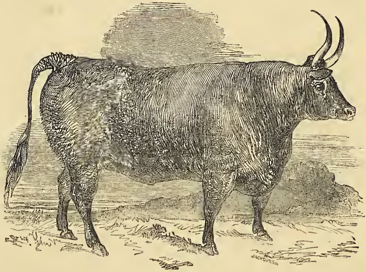


THE DEVONSHIRE BULL.

the nostrils ample; the horns tapering, and of a waxy yellow; the eye large and clear; the neck thick and arched above, with little dewlap; the chest is broad and deep; the breast prominent; the limbs fine-boned; the fore-arm muscular; the hips are high, and the hind-quarters well filled up; the thighs are voluminous; the tail long, slender, set on high, and tufted at the extremity. The ox is taller, and more lightly made, with fine withers, and a slanting shoulder; the breast is prominent; the limbs are fine-boned, muscular, and straight, but rather long; the neck, too, is thin, and rather long, the head small, the muzzle fine; the horns longer than in the bull, slender, and tapering. The whole form, indeed, indicates activity and freedom of action. The skin is moderate, and covered with mossy or curling hair; but occasionally it is smooth and glossy. The colour is universally red, chestnut, or bay, seldom varied with white; a paler space surrounds the eye, and the muzzle is yellow.

The cow is far inferior to the bull in bulk and stature; and the latter is inferior to the ox. The cow is active, with a full eye, and animated expression; the muzzle is very fine, and the general contour light; the ribs, however, are well arched, giving greater internal *room* than might at first be supposed, —a point essential to a good breeder. With respect to the qualities of the Devonshire cattle, they are by many esteemed of the highest order, while others underrate them. The oxen, as workers at the plough, on a light soil, are, from their docility and easy action, of first-rate order; but, on heavy soils, although they are willing to exert their strength, at a dead pull, to the utmost, their want of weight and muscular power is a disadvantage. In light farm work their alertness is conspicuous; and two oxen will perform the labour of one horse. Oxen, however, are not used for labour universally throughout Devonshire, nor, where the practice still continues, is it so much in vogue as formerly; for the breeders obtain a remunerating price from the graziers for their oxen, at an earlier age than that at which it is usual to break them in.

It is the general plan to take oxen into work at two years old: they are put to light labour for the first year or two, and then to harder work, till the age of five or six, when they are grazed or fed on hay, corn, oil-cake, or turnips, for the market; for which they are ready in about twelve months, or even earlier. Few oxen equal the Devons in the promptitude with which they fatten; they do not, indeed, attain to the weight of the larger breeds, but they lay on flesh



THE DEVONSHIRE OX.

rapidly, and with a small proportionate consumption of food; and the meat is of first-rate quality, being fine-grained and beautifully marbled.

As it regards the dairy, the North Devonshire cow holds a moderate rank: some cows yield much more than others; and the milk is extremely rich, producing a more than ordinary proportion of cheese or butter. A good cow will give about three gallons of milk per day, for the first twenty weeks after calving; after this the milk decreases, and stops at the end of about nine months; so that the total annual amount will not be more than about a gallon and a half per day; but then, the proportionate quantity of butter is considerable. A cow of mixed breed, between a North Devon and a Yorkshire bull, has been found to give twenty-four quarts of milk per day, for five months after calving; but the milk was less rich than that of the pure Devon breed, twelve quarts producing only one pound of butter; while eight quarts of the milk of the pure Devon cow returned the same quantity. This, and other mixed breeds, prevail about Exeter, and along the whole vale of the Exe. Many are excellent, being fine in the coat, horn, and bone, and short in the legs.

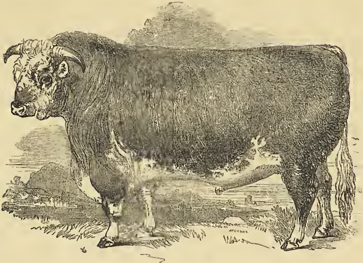
Pure North Devon cows are kept chiefly for breeding, and are superior as nurses, the calves thriving rapidly on their rich milk: a good cow will often fatten two calves a year. When dried, at the proper age, the Devon cows rapidly acquire flesh, and make fair grass-fed beef, in three or four months. The cows weigh from 30 st. to 40 st.; the oxen, from 50 st. to 60 st., and upwards. Numbers of the latter are sent, from the northern parts of the country, to the London market, and the markets of the principal towns in the west of England.

The principal breeders of Devon cattle are the Messrs. Quartley of Molland; Mr. G. Turner, of Barton, near Exeter; Mr. Davy and Mr. Merson, of North Molton, in Devonshire. In other counties, Lord Leicester, Lord Portman, Captain Pelham, and other gentlemen, farming their own estates, have good herds of this beautiful and picturesque breed of cattle.

Devonshire is celebrated for a delicacy prepared from the milk, well known as clouted cream. In order to obtain this, the milk is suffered to stand in a vessel for twenty-four hours; it is then placed over a stove or slow fire, and very gradually heated to an almost simmering state, below the boiling point. When this is accomplished (the first bubble having appeared), the milk is removed from the fire, and allowed to stand for twenty-four hours more. At the end of this time the cream will have arisen to the surface, in a thick or *clouted* state, and is removed: in this state it is eaten as a luxury; but is often converted into butter, which is done by stirring it briskly with the hand, or a stick. The butter thus made, though more in quantity, is not equal in quality to that procured from the cream which has risen slowly and spontaneously; and, in the largest and best dairies in the vale of Honiton, the cream is never clouted—except when intended for the table in that state.

With respect to the South Devon breed, it appears to be superior, for the dairy, to the pure North Devon; some cows being almost equal to the best short-horns in the quantity of milk: these cattle are profitable also to the grazier and the butcher; but their flesh is not equal, in fineness of grain or delicacy, to that of the North Devon breed. They closely resemble the Herefords, and, indeed, often have white faces.

Herefordshire possesses a peculiar breed of middle-horned cattle, allied to the Devons, but heavier and coarser, of a red colour, with white faces, and frequently with white along the back and under parts. The true Herefords are shorter in the leg, heavier in the chine, and wider and rounder in the hips than the Devons; the head is also larger in proportion, and less fine, and the hide thicker, but mellow and supple. As milkers they are inferior to the Devons, but acquire an earlier maturity, and fatten both more rapidly and to a greater weight; consequently, the oxen are commonly sold off at the age of two or three years, in a state fit for the feeder. The graziers of Buckinghamshire, and other counties, purchase, for fattening, great numbers of these oxen at the various fairs, especially the Michaelmas fair at Hereford; they are brought to the London markets, when ready, and meet an excellent sale. Few oxen are, in fact, fattened in Herefordshire; but only heifers and cows for home consumption. Herefordshire is essentially a breeding county (not a dairy nor yet a feeding county); and the great object is to supply the graziers with a valuable stock. The cows preferred are worthless as milkers; but such as experience has taught the breeder will produce the best offspring: they are rather small and light, but roomy; insomuch that they often bear bull-calves, which soon attain to thrice their own weight. These cows, however, when dried, fatten rapidly, and become full-fleshed and rounded.



HEREFORD BULL.

Formerly it was the custom to work the oxen for two or three years before sending them to market; but it is now found far more profitable to take advantage of their early maturity, and sell them without unnecessary delay, thereby saving fodder, and also obviating the slow return of capital which the long keeping of oxen necessarily entails.

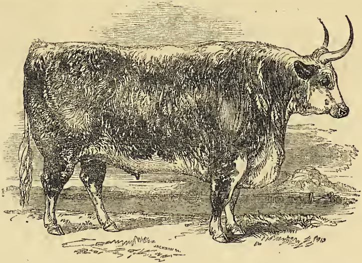
As dairy-farming is not practised (at least as a general rule) in Herefordshire, the milk of the breeding cows is given almost all to the calves; nor is this plan to be condemned: the breeder's great aim is to ripen his beasts for the grazier, or at least for early fattening. A mingled system of breeding and dairy-farming would defeat its object and lead to loss, for neither department would be properly conducted.

Gloucestershire, closely as it approximates to Herefordshire, is a dairy county, celebrated for its butter and cheese, but especially the latter, of which large quantities are sent to the London market.

The old Gloucester breed of cattle was rather small, of a reddish-brown colour, with a streak of white running up the back from the base of the tail; indifferent in figure, but well adapted for the dairy. This old middle-horned race is now seldom to be met with, at least pure; it has been crossed by the long-horns of Wiltshire; and this mixed breed, while it exhibited superiority of size, and a tendency to fatten, was little, if at all, deteriorated as to milking qualities. In the hilly or Cotswold districts, a mixed breed, of variable goodness, prevails. It is in the fertile and lower portions of this county, such as the vale of Berkeley and the banks of the Severn and Ledden, that the richest land for the cultivation of crops and the pasturage of cattle is found.

In the management of the milch cattle of this fertile district, old rich pastures are greatly preferred for them; for it has been ascertained by experience that lands, however luxuriant, which have been much or recently manured, produce an alteration in the quality of the milk, so as to render the cheese made from it very inferior. It is also found to be an excellent plan to remove the cattle frequently from one pasture to another; and, when the hay is off, to turn them upon the new after-grass of the meadows, the succulent young herbage being conducive to abundance of good milk.

The produce of a good cow should average from three and a half to four and a half hundred weight of cheese per annum, or from twelve to eighteen quarts of milk per day. Some first-rate cows, on rich pasturage, have been known to yield



HEREFORD OX.

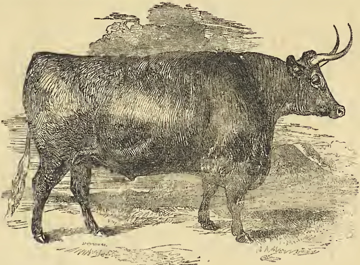
twenty-four quarts every day, at two milkings, for the space of seven months after calving; but this is an uncommon circumstance. After the seventh month the quantity of milk rapidly diminishes, till within six weeks previously to calving again, when the cow is no longer milked. Mr. Rudge, in his "Agricultural View of Gloucestershire," considers that the profit on a dairy of twenty good cows, costing £20 each (in all £400), fed upon forty acres of land, will amount to about £136 per annum. He calculates the cost of the dairy utensils as under £24.

Two sorts of cheese are made, single and double Gloucester; the former is prepared from skimmed milk, and a superior sort from a mixture of skimmed and pure milk; the double Gloucester from pure unskimmed milk only. Great quantities are made in the vale of Berkeley.

During winter the milch cows are kept in dry and sheltered situations, and supplied with hay, as are also the young store beasts; in the hilly districts, however, less attention is paid to them at this season, and they often suffer greatly. This is bad management and false economy: the cows ought to be kept in fair condition, so as to benefit immediately by the spring pasturage. Sufficient shelter is often too much neglected: good sheds are essential as a protection against severe cold; nor are they less serviceable in the extreme heats of summer. Deficiency of food, moreover, deteriorates and stunts the growth of the young stock, foiling the best endeavours for the improvement of the breed. This mismanagement is, however, chiefly confined to the hilly district, where the soil is unproductive, rendering winter fodder scarce; or where, from old custom, no efficient attempts are made to meet the exigency. More liberality would be far more profitable.

The prevalent breed of cattle in Sussex closely resembles that of North Devon; there are, however, certain points of difference; and, on the whole, the Sussex ox is a heavier and coarser animal than the Devon, but equally valuable for farm-labour, and for the fineness of the grain and the marbling of the flesh.

Its colour is of a uniform blood bay, or chestnut red; the horns are well-set and tapering; the head is small, the eye large, the throat clean, the neck thin; but the shoulders are thick and heavy, and the forelimbs rather coarse,—that is, less fine in the bone than in the Devon. The barrel is well formed and capacious; the back straight; the hips wide and well covered; the tail is thin, and tufted at the extremity,



SUSSEX OX.

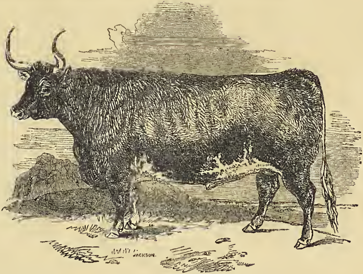
and is set on nearly as high as in the Devon; the hide is mellow and fine; the coat is mostly sleek, but sometimes wavy.

The Sussex cow is kept principally for the sake of breeding: her milk, though excellent in quality, being small in quantity; hence her place in the dairy is supplied by various crossed breeds, which are found to answer best for the pail.

In Carmarthenshire, Brecknockshire, Cardiganshire, and Pembrokeshire, an old and useful breed of black cattle still prevails. The Pembroke ox is short in the limb, with moderately small bone; deep and round in the carcass, with rough short hair; and a hide of moderate thickness, and pleasant to the touch. The head is moderately small, the aspect animated, and the horns are white. Some individuals have white about the face and under parts, and some are of a dark brown. These cattle are small but hardy, and the oxen fatten well on indifferent land. The character of the meat is first-rate; the grain is fine, and beautifully marbled, and its flavour excellent. The cows are fair milkers, and, from their hardiness, are very profitable to the small farmer or cottager. The oxen are as profitable to the grazier; they are good workers, strong and active, and are ready at the age of four or five years for the market, arriving early at maturity. Great numbers of these cattle are sent to the London market.

A native middle-horned race of cattle exists everywhere in Ireland, and particularly in the hilly and mountain districts, where, from its hardiness, it thrives on indifferent pasturage, and contrives unshielded, during the winter months, to find support. There are several varieties of this stock, varying in minor details of size and contour; but all are of small size, active, and vigorous. Some are of a black colour, with rough curly hair; others are brindled; others are mottled red and white; some, again, are black or brown, with white faces. All fatten rapidly when removed from a moorland pasturage to good feeding lands; and the cows often prove excellent milkers. Among these the Kerry breed is much esteemed; it yields, in proportion to its size, a fair quantity of excellent milk; and, when dried, it quickly fattens, even upon inferior fare. In Connaught a larger and improved breed is found, still, however, presenting the same character.

It must here be observed, that, in many places, and especially where agricultural improvements have been carried on, the cattle have been crossed with various breeds from England and Scotland, insomuch that the original characters



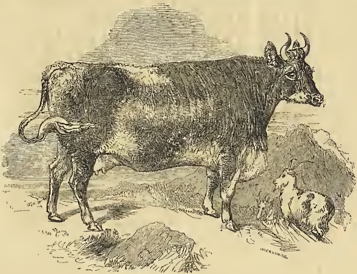
PEMBROKE OX.

are either altogether lost, or considerably modified. This observation applies equally to the middle-horned races and to the old heavy long-horns. Durham short-horns, Herefords, North Devons, and Ayrshire cattle have been introduced by zealous cultivators, giving rise to valuable mixed breeds. These improvements are, of course, undertaken exclusively by landed proprietors, or large farmers: the small farmer, who keeps a few cows only, or the peasant, who keeps one, are content with the old breeds. Yet however slowly, and however checked by circumstances, the march of improvement, once begun, will, it is to be trusted, continue to advance, and spread its benefits universally.

Little cheese is made in Ireland; but vast quantities of butter are exported, not only to England but to other parts of Europe. In the dairy counties,—viz., Carlow, Cork, Kerry, Leitrim, Sligo, Waterford, and others, the principal object is the acquisition of good milch cattle; and, as milkers, some of the old breeds are excellent. Irrespective of butter, however, Ireland has a most important trade in cattle; besides supplying an immense quantity of beef to the navy and merchants' vessels, vast numbers, both of live cattle and slaughtered carcasses, are imported into England. We have no means now of correctly ascertaining the extent of this traffic; but formerly, while the law placed the traffic on the footing of a coasting trade, the official data were astonishing. In 1812, 79,285 head of oxen and cows, of the estimated value of £439,128 were imported into England, constituting the eighth part of the beef consumed. In 1824 the number of cattle amounted only to 62,393, and, in 1825, to 63,524.

Within the last twenty years the facilities of transporting both cattle, carcasses, and salted meat, by means of steam-vessels, have been rapidly increased; consequently, *cæteris paribus*, a proportionate increase of traffic, it may be concluded, has taken place; but we have no returns upon which to form a correct estimate. Certain it is that cattle may be shipped at an Irish seaport one day, and landed in England on the next; whereas, formerly, they were often detained, by stress of weather, for days at sea, the vessel being driven far out of her course, and the cattle all the time suffering for want of food and water.

Turning to Scotland, it may be observed, that, from the most remote times, this land of heath and mountain has been the nursery of an original breed or race of black cattle, of wild aspect, of beautiful symmetry, and though small, yet vigorous and hardy; patient of hunger and cold, and rapidly



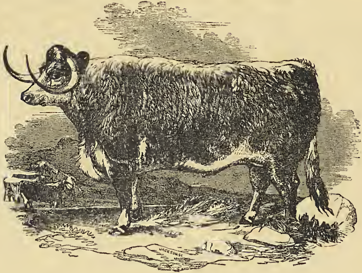
KERRY COW.

fattening on tolerable land. These cattle are middle-horned; the head is short, broad, and flat across the forehead, and adorned with elegantly-turned horns; the muzzle is fine, the eye bright and large, the body compact, and the limbs short, clean, and muscular. Several varieties may be noticed; and of these the western race, occupying the Hebrides, or Western Islands, and the adjacent parts of the mainland, is the most pure. Change the colour from black to white, and there is little difference between a beautiful kyloe from Arran, Islay, or the Isle of Skye, and one of the wild cattle of Chillingham. If we may venture an opinion, they display more nearly than any other breed the characters of the mountain cattle of our island when invaded by Cæsar. We say the mountain cattle, because we suspect that a larger and heavier long-horned race even then tenanted the swampy plains and low grounds of many portions of the country.

The kyloes, or black cattle of the Western Isles and Highlands of Scotland, constitute the chief wealth of that portion of Caledonia. The Hebrides alone, including Long Island (composed of Lewis, Uist, and others), are calculated to contain a hundred and fifty or sixty thousand head of these cattle, of which perhaps thirty thousand annually cross the ferries for the mainland, whence great numbers find their way into the parks and pasture-lands of England, even to the southern coast.

It must not be supposed that the droves speedily reach their southern destination; on the contrary, their journey is very protracted, and broken by long intervals. During the first winter, they are allowed to graze in the pastures of the north; and then, as the spring advances, are driven farther south. As they proceed in this manner from stage to stage, their numbers diminish by sales, or by the respective lots reaching the parties to whom they were consigned; but those destined directly for the midland or southern counties, where the pasture-lands of some large landed proprietor await their reception, are months upon the road, unless indeed, as is often the case, they are sent by sea to some convenient port, and there landed.

In a well-bred kyloe, the following characters are conspicuous:—The head is small and short, with a fine and somewhat turned-up muzzle; the forehead is broad; the horns wide apart at their base, tapering, and of a waxen yellow; the neck is fine at its junction with the head, arched above, and abruptly descending to the breast, which is broad, full, and very prominent; the shoulders are deep and broad, and



IRISH OX.

the chine is well filled, so as to leave no depression behind them; the limbs are short and muscular, with moderate bone; the back is straight and broad; the ribs boldly arched, and brought well up to the hips; the chest deep and voluminous; the tail high set, and largely tufted at the tip; the coat of hair thick and black: such is the bull. The ox differs in proportion. The cow is far more slightly built, and her general contour is more elongated. Although, as we have said, black is the ordinary or standard colour of the kyloe, many are of a dark reddish brown, and some of a pale or whitish dun.

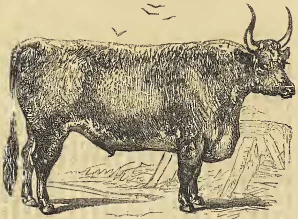
Some little difference in size, as might be expected, exists among the kyloes of different localities. Those of the Isle of Skye, and of Lewis and Uist, are rather smaller than those of Islay, Jura, Argyleshire, Lochaber, or Inverness.

Multitudinous as are the cattle bred and reared in the Hebrides, few are fattened there, nor is much attention paid to the dairy: few farmers keeping more milch cows than will serve the wants of the family in milk, butter, and cheese.

The kyloe cow does not yield much milk, but that is of extraordinary richness. In North Uist and Tiree, however, where the herbage is generally good, both cheese and butter are made for the markets, each cow being estimated to yield 22lbs. or 24lbs. of the latter, or from 80lbs. to 90lbs. of the former, during the summer.

Great attention is paid to the rearing of calves; and, far more than under the old *régime*, to the treatment of the cattle, which formerly had little or no provision made for them during the winter, and were ill fed even during the summer; the consequence of which was, that a large per centage died of starvation and diseases attendant upon innutritious fare. The cows, it is true, were housed during the winter; often, indeed, they shared the rude shealing of the peasant; but this bettered their condition very little, for suffering and privation were the lot of the family.

In well-managed establishments at the present time, the cattle are treated upon principle. The calves, all of which are reared, are generally produced in February, March, and April. Three times a day they are allowed to draw milk from the udders of their dams, which are afterwards emptied by the dairymaid. When at the age of three or four months, the calves are sent only twice a day to their dams in the meadows, and are weaned in September, or early in October. During the winter they are housed, and fed on hay and turnips, as are also the breeding cows; the rest are kept in the pastures,



ARGYLL OX.

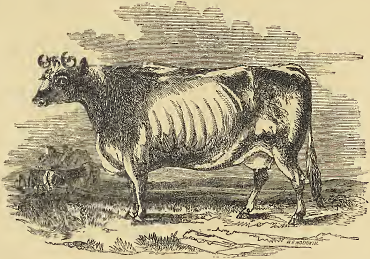
and when these become bare, are supplied with coarse hay, and sometimes with turnips or potatoes.

In Argyleshire the kyloes are larger than in the Hebrides, and many of them are models of beauty—pictures of a noble semi-wild race, descendants of the old mountain breed, which once roamed the wilds of Caledonia, and came "crushing the forest" to meet the fierce hunter.

Besides these kyloes, there are other breeds in Argyleshire; the Ayrshire cow is principally used for the dairy.

In the eastern counties of the Highlands, as Aberdeenshire, Forfarshire, Banffshire, Kincardineshire, &c., various breeds of kyloes, more or less improved, prevail. Aberdeenshire is a great grazing land, and in this and the adjacent counties there are many spirited and successful breeders. Great numbers of cattle from this part of Scotland are purchased by the English graziers for the London market. In the Shetland Islands, the Orkneys, and the northern counties of Scotland, a small, shaggy breed of cattle, evidently of the same stock as the kyloes of the Western Isles, is commonly to be seen. Stunted in growth by hard fare on the bleak moorlands, still these dwarfish cattle have much to recommend them. They are fitted for their high northern locality; their deep, rough curly coat defends them against the severities of the winter; they live where most other cattle would starve; in some favoured spots they even fatten; and if transported to some tolerable pasturage, become ripe for the butcher with incredible rapidity. But they do not thrive if taken too far south; they become enervated; they pine in the midst of plenty, and disappoint the hopes of the grazier. Within late years this breed of *stots* has been improved, by crossings with the kyloes of the Western Isles and the Argyleshire strain; and excellent cattle are sent to the south, to be fattened in congenial pastures.

In Ayrshire, and the adjacent portion of the Lowlands, there is an admirable breed of milch cattle, independently of those that are grazed there for the butcher, which, from whatever source they originated, owe much to the care and selection of judicious breeders. At some period or other there has evidently been a cross of the Durham or Holderness, and perhaps also of the Alderney. This breed, which became established from the middle to the close of the eighteenth century, has found its way not only into England, but also into Ireland and Wales; recommended by the excellency of the cows as milkers, although they are under the middle size. It has been estimated that a good Ayrshire



AYRSHIRE COW.

cow will yield, for two or three months after calving, five gallons of milk daily; for the next three months, three gallons daily; and a gallon and a half for the following three months. This milk is calculated to return about 250lbs. of butter annually, or 500lbs. of cheese. The foregoing estimate is, however, somewhat exaggerated; and, perhaps, during the best of the season, four or four and a half gallons of milk is the average product daily of a good cow, kept in fair condition. Every thirty-two gallons of unskimmed milk will yield about 24lbs. of cheese, and ninety gallons 24lbs. of butter. We are supposing a good farm, and a first-rate stock of Ayrshire cows; and, considering the size of the cattle, this return from each cow is very considerable. The mode in which the cows are treated by an enterprising and successful farmer of Kirkum is thus detailed:—He "keeps his cows constantly in the byre (or shed) till the grass has risen, so as to afford them a full bite. Many put them out every good day through the winter and spring, but they poach the ground with their feet, and nip up the young grass as it begins to spring; which, as they have not a full meal, injures the cattle. Whenever the weather becomes dry and hot, he feeds his cows on cut grass in the byre, from six o'clock in the morning to six at night, and turns them out to pasture the other twelve hours. When rain comes, the house feeding is discontinued. Whenever the pasture grass begins to fail in harvest, the cows receive a supply of the second growth of clover, and afterwards of turnips strewed over the pasture-ground. When the weather becomes stormy, in the months of October and November, the cows are kept in the byre during the night, and in a short time afterwards during both night and day; they are then fed on oat-straw and turnips, and continue to yield a considerable quantity of milk for some time. Part of the turnip crop is eaten at the end of harvest and beginning of winter, to protract the milk, and part is stored up for green food during the winter. After this store is exhausted, the *Swedish* turnip and potatoes are used along with dry fodder, till the grass can support the cows. Chaff, oats, and potatoes are boiled for the cows after calving, and they are generally fed on rye-grass during the latter part of the spring."

In this part of Scotland, a peculiarly rich cheese, termed Dunlop cheese (from the district of that name, in Cunningham, where it was first made), is prepared. It is the product of the unskimmed milk; but common or inferior cheese is also made from the milk after it is skimmed.

With regard to the Ayrshire breed of cattle, as fitted for the grazier, it is less so than for the dairy farmer; nevertheless, in rich lands, the oxen fatten with considerable facility, and even the cows accumulate flesh; but, then, they cease to yield much milk, and, as there are decidedly better breeds for the purpose of the grazier, few are purchased by the great cattle-dealers for depasturing on the luxuriant feeding-grounds of England. Undoubtedly their great value is as milkers, and that principally in their own territory, to the feed and climate of which they seem to be constitutionally adapted.

The improved Ayrshire cow, of the present day, has the head small, but rather long, and narrow at the muzzle, though the space between the roots of the horns is considerable; the horns are small and crooked, the eye is clear and lively, the neck long and slender, and almost destitute of a dewlap; the shoulders are thin, and the fore-quarters generally light; the back is straight, and broad behind, especially across the hips, which are roomy; the tail is long and thin. The carcass is deep, the udder capacious and square, the milk-vein large and prominent; the limbs are small and short, but well knit; the thighs are thin; the skin is rather thin, but loose and soft, and covered with soft hair. The general figure, though small, is well proportioned. The colour is varied with mingled white and sandy-red.

The bulls mostly preferred by the dairy farmers are comparatively light in the head and neck, broad in the hips, and full in the flanks; the neck is arched above, the horns are short and wide apart, and the limbs short but muscular.

It has been calculated that there are in Ayrshire upwards of 60,000 head of cattle, of which more than half are dairy-cows.

We may now turn to the polled or hornless races of cattle, of which Galloway furnishes us with a breed remarkable for many excellencies.

We have already said that we do not regard the polled cattle as distinct from the horned breeds, with which in general form, contour, and qualities, they closely agree. We see little essential difference between the polled cattle of Galloway and those of Argyleshire, or Arran—in every respect they are black cattle, or kyloes, only destitute of horns. If, then, we arrange the polled breeds under a separate head, it is more for the sake of convenience than of absolute propriety.

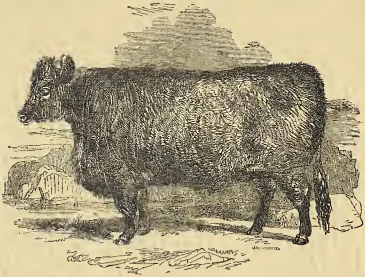
The Polled Stock of Cattle.—The semi-wild cattle of Chatelherault Park, in Lanarkshire, the descendants of an ancient race, are mostly, if not always, polled,—and probably the present polled black cattle of Galloway may be derived from the same ancestry.

Formerly, few polled cattle were to be seen in this district of Scotland; but within the last century the breed has greatly prevailed, and it is highly valued. Occasionally, cattle make their appearance with very minute or rudimentary horns, attached, however, to the skin merely, and not sheathing a bony core, indications of a tendency to the acquisition of these natural weapons; and were the point to be followed up by the breeder, these might be soon restored. The breeder, however, is interested in keeping his polled Galloways pure; they are in great request by the grazier, they are of considerable size, fatten readily, accumulating flesh on the best parts; they are less wild than the horned black cattle, and less quarrelsome, and, under certain circumstances, as on ship-board, may be packed somewhat closer than the others.

A well-bred Galloway ox is of admirable form: all is close and compact; the barrel is rounded and ribbed home to the hip-bones; the chest is deep, the shoulders thick and broad; the neck short and thick; the head clean; the back straight and broad; the limbs short, but extremely muscular; the skin moderate, but mellow, and well covered with long soft hair—that on the ears, which are large, is peculiarly rough and long.

In the bull, the head is heavy, the neck thick, and boldly erected above; the frontal crest or ridge is elevated and covered with long hair; and the general form is robust, with great depth of chest and roundness of barrel.

The cow is much lighter, but yet presents those points which attract the regard of the grazier. As a milker, she is inferior; for though her milk is rich, it is deficient in quantity, and on the average, will not amount to more than six or eight quarts per day, during the summer months, after which it rapidly diminishes. This inferiority, as it respects milk, is of little importance to the Galloway farmer, his chief pursuit being the rearing of grazing stock; consequently, as a rule, he never kills his calves, but looks to profit from them at a future day. These are generally dropped at the latter part of winter, or very early in spring, and are permitted access to the mother, at certain times daily, as long as she continues in milk. For the first five months the dairy-maid and the calf, morning and evening, divide the contents of the udder pretty equally between them; after this period, when the calf begins to graze, its allowance is diminished, till the cow drying, this



GALLOWAY OX.

supply is of course stopped altogether. During the winter, the young animal is housed at night, and fed upon hay, turnips, and potatoes, with a liberal hand.

Of the calves bred, a few of the most promising females only are reserved as breeders,—other females are rendered sterile; heifers in this condition fatten with great rapidity, arrive very early at maturity, and as their meat is deemed peculiarly delicate, sell for good prices. Some of these heifers have attained to singular weights for their stature,—one of great beauty, called the Queen of the Scots, fed in Norfolk, and exhibited at the Smithfield Cattle Show, a few years since, weighed one hundred and ninety stones, of eight pounds to the stone. She stood five feet two inches at the shoulder, and was a model.

Many thousands of polled cattle are sent from Galloway every year to the south, and rapidly fatten in pastures but little more luxuriant than those on which they were reared, although, it must be confessed, that there are in Galloway fine tracts both of grass and white clover. It is chiefly in Norfolk and Suffolk that the polled Galloways are fed for the London markets; they are purchased by the drovers, or jobbers, at the various cattle fairs in the district, often in large numbers, and are then sent onwards in droves of two or three hundred, preceded by a man called the topsman, who makes arrangements for their rest at different stations, and takes care that sufficient grass, hay, or turnips, are provided for them. In about three weeks they arrive in Norfolk, the travelling expenses amounting to about 24*s.* a head in summer, and 34*s.* or 35*s.* in winter. The average cost of a stirk in his second year, is from £3 to £4; in the third year, £6 or £7; and of oxen in the fourth year, £10, £11, or £12, taken by the lot. Hence it is apparent that a jobber who purchases six or eight hundred head of cattle (whether he pay in bills or cash), involves himself in a serious undertaking; if he clears from 3*s.* to 5*s.* a head, he is amply remunerated, but should the markets in Norfolk or Suffolk be low, he must sell at a loss, and may thus be ruined; moreover, he must expect some casualties on the road, and these must be taken into the account.

Besides these large speculators, there are others who travel from fair to fair, and purchase cattle, varying according to the extent of their means, from 20 to 100 head; these they resell, or drive over the borders to Carlisle, in hopes of disposing of them to advantage at the cattle fairs. If successful, they return home to make fresh purchases, and soon set off again for the English borders. Thus the stock of the Galloway breeders is continually changing hands, 25,000 or perhaps 30,000 head of cattle being thus annually transferred to the English pasture lands.

In Dumfries, the largest cattle market in the south of Scotland is held, and here vast numbers of polled black cattle are bought and sold.

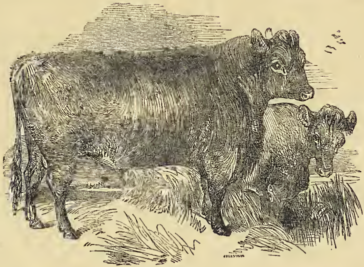
A very fine polled breed of cattle has long existed in Angus (Forfarshire) and the adjacent parts of Kincardineshire. This breed is closely allied to, or perhaps is really identical with, that of Galloway, and is equally celebrated for its quietness of disposition, its tendency to fatten, and its fitness for stall-feeding. These cattle are, however, more apt to be somewhat marked with white than the Galloway: they generally run larger, are longer in the leg, thinner on the shoulder, and flatter in the side; on the whole, perhaps, they are not equal to the Galloways in the fineness of the meat; nevertheless, some beasts of extraordinary quality have been exhibited and gained prizes, both at the shows of the Highland Society of Perth, and those of Smithfield.

There is considerable difference both in the climate and in the treatment to which the Galloway and Angus doddies are respectively subject. In Galloway, the climate is generally moist, and after the first winter the cattle are kept in the pastures, and supplied with hay only during the severities of the season. In Forfarshire, on the contrary, which is a great turnip county, the cattle are wintered in straw-yards, and supplied with turnips as well as dry fodder, and grazed on dry pastures during the summer. Hence, perhaps, the superiority of size in the Angus cattle to the Galloways, their sleeker coat, and their generally better condition, when sold off to the drover; nevertheless, when driven to the south, they do not quite so well answer the expectations of the grazier or the butcher; probably they thrive best in their own district, to the soil and climate of which they are peculiarly adapted, and to which they owe their characteristics. Still, however, they remunerate the grazier, and at the fairs of Brechin and Forfar great numbers are purchased by the English dealers.

In this district many calves are fattened for the butcher, and great care is taken in rearing them; a cow often gives suck to two calves—her own and a stranger; and in this case they are allowed to drain her udder (one on each side) three times a day: when these are weaned, two other calves supply their place. The first set are weaned and ready for grass early in May, the second set early in August. After this, a single calf, destined for the butcher, is put to the cow; and thus, five calves are suckled; the first four being usually intended for stock. Such, at least, is the plan followed by some of the large breeders, who have extensive cow-houses, and every convenience for attending to cattle, and who carry on the business with spirit. Among these, Mr. Youatt particularises Mr. Watson, of Keillor, as a gentleman whose judicious efforts in the rearing and improvement of this breed were crowned with marked success. We are informed that this gentleman obtained more than one hundred prizes, besides several valuable pieces of plate; and that he raised the Keillor breed to the highest possible grade of excellence. At the same time Mr. Youatt acknowledges, that "the Angus polled cattle generally are not of that superior quality and value which an account of the Keillor breed would seem to indicate, or, what is the case with many other breeds, they are exceedingly valuable in their own climate, and on their own soil, but they do not answer the somewhat unreasonable expectations of their purchasers when driven to the south."

Leaving Scotland for England, we shall find that the counties of Norfolk and Suffolk present us with polled breeds of cattle, not originals of the two counties respectively, but the result of the introduction of the polled cattle of Scotland.

Formerly, it appears that the Norfolk cattle were of the middle-horned breed, somewhat resembling the Devons; but this breed gradually gave way before the Galloways, of which Norfolk was one of the chief feeding districts for the London markets. It was rational that the farmers, seeing the superior value of the latter, should endeavour to naturalize them; and this they not only accomplished, but, in process of time, their old stock became almost entirely superseded. Yet the Norfolk polled cattle have departed from the pure Galloway type; and this is what might have been anticipated. Change of soil and climate, perhaps, with other causes, have produced their effects: and though the characteristics of the Galloway breed are not lost, they are greatly modified. The cows are, perhaps, somewhat improved as milkers, but the cattle generally stand higher on the limbs than do the Galloways, and are flatter in the ribs and thinner in the chine: they are taller, but not so heavy for their stature; they do not feed so rapidly, nor is the meat so fine in grain. Some are black, but most are of a red tint, often more or less varied with white. It must be confessed, however, that with regard to the excellence of these



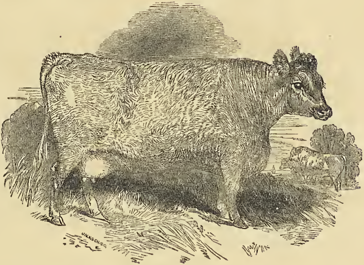
NORFOLK BULL AND COW.

cattle there is great difference; perhaps the regular accession of pure Galloways militates generally against any very extensive efforts by way of their improvement: yet it is certain that where their cultivation has been properly attended to, great success has been the result. Another point which tells against them, is the introduction and spread of the Durham and Yorkshire short-horns; nor must we overlook the Devon breed, which by many landed proprietors in Norfolk is highly esteemed. It is by Devon oxen that the farm-labour in Norfolk is performed, as far, at least, as these animals are employed; and Devon cows are much used for the purpose of the dairy.

In Suffolk a breed of polled cattle, known by the name of Suffolk duns, has been long celebrated; though the dun colour is now by no means a common character; indeed it is not preferred; for, with late improvements, other colours, as red, red and white, brindled, and yellowish or creamy white, have almost abolished the dun. There can be little doubt but that the polled Suffolk cattle owe their origin to the Galloways: not that they are of the pure strain of the Galloways; on the contrary, they are the result of interbreedings with them; and their chief qualifications are as milkers, rather than feeders; although, in this latter respect, even the lean cows when dried show no little of the properties of their Galloway progenitors. A good Suffolk milking cow is lean and spare, with a light thin head, a clean neck, and little dewlap; slender, but short limbs; a heavy and well-ribbed carcass, a large udder, and swollen milk-veins. Generally the hip-bones are high and prominent, the loins narrow, and the chine hollow. There is in all this nothing of the true Galloway contour, and where the points characteristic of this breed prevail, though but in an inferior degree, the animal is fitter for the feeder than the dairyman.

Few cattle excel the Suffolk as milkers; a good cow, in the plenitude of her milk, will often yield six gallons a day; some have even yielded eight: nor is the milk destitute of richness, especially when the animals have good pasturage. Mr. Culley, who says that the best butter and worst cheese are made in Suffolk, gives the following summary as the yearly produce of one of these cows, which, "like all other deep milkers, are very lean, very plain, and very big-bellied." He quotes Mr. Young as his authority:—

	£	s.	d.			
Three firkins of butter (one firkin ½ cwt.) ..	4	16	0			
Three quarters of a wey of cheese	1	4	0			
A hog	1	0	0			
A calf	0	10	0—	7	10	0



SUFFOLK COW.

He adds, that the weight of this breed of cattle is, on an average, about fifty stones.

Mr. Parkinson has a different calculation: he considers the quantity of butter as amounting to 184lbs.; which, at 1*s.* per lb., will return £9. 4*s.*; a bog, £2; the calf, 15*s.*; and the skim-milk cheese from £2. 5*s.* to £2. 15*s.* Total, about £15. 13*s.*

Perhaps the medium between these two statements approximates to the truth. Mr. Youatt says that 50,000 firkins of butter are sent to London each year from Suffolk; but we do not know on what grounds he made his estimate.

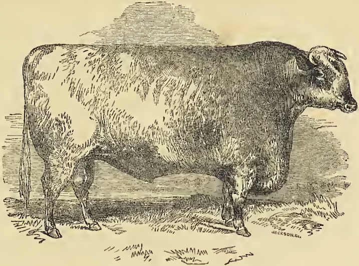
When dried, the Suffolk polled cow acquires a good condition with considerable rapidity, and fattens to forty or forty-five stones; the meat is of good quality—that indeed of the ox very superior.

Besides the polled cattle we have here noticed, varieties destitute of horns occur, which confessedly belong to a horned race, and must not be considered as distinct. For instance, there are polled Devonshire cattle, or *nats*, as they are termed, which, in all points, the horns excepted, exhibit the characters of that breed. There are polled cattle of the short-horned or Yorkshire breed: the fact is, as we have before intimated, there are polled cattle of most breeds; the absence of horns is a mere accidental defect, rendered hereditary by the inter-breeding of the cattle thus deficient; but these cattle, nevertheless, often exhibit a tendency to the development of their natural horns, and, indeed, show more than rudiments of them; so that it would be easy to extract a horned from a polled stock. Hence, then, we regard the distinction between polled cattle and others as arbitrary, or to be made only for convenience, unless there are other grounds of separation.

Vast numbers of pure Galloways, and many Welsh and Irish cattle, are fed in Suffolk: short horns have been also introduced, and some Devons are also to be seen. Norfolk and Suffolk are both great turnip counties.

We may now turn to the breed of cattle known under the title of short-horns, a breed which, irrespective of the form or length of the horns, has good claims to be regarded as constituting a distinct variety, and which, by the judicious exertions of various cultivators, has been elevated to a state of high perfection.

THE SHORT-HORNED BREED.—This breed, called by many the Dutch breed, and believed to be originally from Holland, has been long known in the counties of Durham and York, where the cows are held in high reputation as milkers; but



SHORT-HORNED BULL.

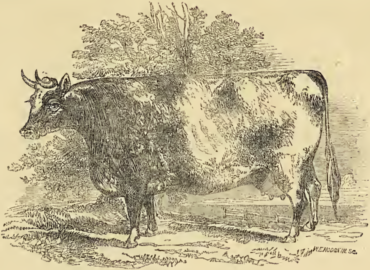
the oxen were indifferent feeders, their skin red, coarse in the offal, ill-formed, and produced meat of an inferior quality. How great is the change which the breeder's pains and care have effected! In no strain of cattle is this more palpable; for now, while their milking properties are preserved, the tendency to fatten is brought to a very high ratio; and these qualities are combined with size, a magnificent figure, the production of beef most beautifully grained and of the highest excellence. Qualities, indeed, hitherto considered as incompatible with each other, meet together in the improved short-horns of Holderness or Teeswater celebrity. In Mr. Culley's time ("Observations on Live Stock," 4th edit., 1807) we find, from his own statement, the great improvement which had taken place in this breed. He observes, that these cattle differ from others "in the shortness of their horns, and being wider and thicker in their form and mould, feeding, consequently, to the most weight; in affording by much the greatest quantity of tallow when fattened; in having very thin hides, with much less hair upon them than any other breeds, Alderneys excepted. But the most essential difference consists in the quantity of milk which they give beyond any other breed. The great quantity of milk, thinness of their hides, and little hair, is probably the reason why they are tenderer than the other kinds, Alderneys excepted. It is said of this kind, and, I suppose, very justly, that they eat more food than any of the other breeds; nor shall we wonder at this when we consider that they excel in these three valuable particulars,—viz., in affording the greatest quantity of beef, tallow, and milk. Their colours are much varied; but the generality are red and white mixed, or what the breeders call flecked: when properly mixed the colour is very pleasing and agreeable." Much in Mr. Culley's time remained to be done; but he says: "In a journey through Lincolnshire, I was happy to find that many sensible breeders had improved their breed of short-horned cattle (since my visiting that fine country ten years before) by good bulls and heifers, brought from the counties of Durham and York, on both sides of the Tees, where the best are confessedly bred. In another excursion, in 1789, I met with a Mr. Tindale, of ——, near Sleaford, who had the best breed of cattle which I ever saw in that county, and perhaps inferior to few in any part of the kingdom. I was shown an ox, near Lincoln, of this breed, that for true form and nice handling exceeded any bullock I ever remember to have seen."

With respect to the milking properties of these cattle, the same writer states that there are instances of cows giving thirty-six quarts of milk per day, and of forty-eight firkins of butter being made from a dairy of twelve cows during the season; but the general quantity is twenty-four quarts of milk per day, and three firkins of butter, from a cow.

The improvement in the short-horns, which commenced on the banks of the Tees, under the superintendence of spirited individuals, not only continued progressive, but extended its influence around. By what crosses the Teeswater strain became established it is scarcely possible to-say; there is, we believe, some reason for thinking that one was with the semi-wild white breed, and another with choice cattle imported directly from Holland. Be this as it may, the Teeswater stock became celebrated, though still not perfect, the oxen being often extravagantly large, and sometimes not true in their proportions. We hear of an ox bred by Mr. Milbank, which, when slaughtered, at five years old, weighed (the four quarters) 150 stones, of fourteen pounds to the stone, producing sixteen stones of tallow; and of a cow, killed at the age of twelve years, which weighed upwards of 110 stones. It was reserved for Mr. C. Collings to accomplish the perfection of the Teeswater breed, already so excellent. It was by accident that this experienced breeder became possessed of a young bull (a calf when Mr. Collings purchased him), in which he discovered qualities adapted, as he thought, and as it proved, to elevate the strain. This bull he named Hubback; he was smaller than the generality of the Teeswater cattle, of excellent contour, and with an extraordinary propensity to fatten, insomuch that his utility as a bull was limited to a short period. From this bull descended a renowned stock; he was the sire of the dam of the celebrated bull Foljambe, and Foljambe was the sire both of the sire and dam of Favourite, the sire of the "Durham Ox," which, in February 1801, was sold for public exhibition. In improving his breed, Mr. C. Collings had recourse to a single cross with the polled Galloway; he then bred back to the short-horns, and the result was a stock called the Alloy, at first in contempt, but afterwards by way of distinction. His cross was between a short-horned bull, call Bolingbroke, and a beautiful red Galloway cow, which produced a bull-calf; this, in due time, was the sire of a bull-calf by a pure short-horned cow called Johanna; this latter bull-calf, again, became the sire of the cow Lady, by a pure short-horned cow, which was the dam also of the noted bull Favourite. Many animals of this breed have fetched extraordinarily high prices. Some of the cows have fetched as much as four hundred pounds, and one bull, Comet, at six years old, was sold for no less a sum than a thousand guineas.

There is in the present improved short-horns a union of many qualities once deemed incompatible: early maturity, quick feeding, and that to a great weight; an abundance of inside fat, and meat of a fine grain; while the cows are plentiful and steady milkers, and fatten rapidly when dried: these are the characteristics of the breed. Many improvers, it is true, look rather to the grazing properties of these cattle, and forget their value for the dairy; they esteem them in proportion to their early arriving at maturity, and their aptitude to fatten; and selecting their breeding stock with such views, the milking properties of the cows become in reality diminished. But this is to develop one excellency at the expense of another, and that without necessity; for in this breed, as has been abundantly proved, both qualities can exist, not of course at the same time, for the milking cow does not fatten until dried, but in subjection one to the other. If, indeed, the milk yielded by the improved short-horns be somewhat less in quantity than that given by the old unimproved strain, it is of far richer quality, and returns more butter in proportion. Nearly four gallons of milk have been yielded, morning and evening, even by the highest bred short-horns, and some have even given more; and these very cattle have proved, after having been dried and fattened, admirable in the carcass. To the dairy-farmer, therefore, the short-horns are as valuable as to the grazier; and, in fact, it is with cows of an improved short-horn breed, from Yorkshire or Durham, that the great dairies for the supply of London with milk are stocked. The Yorkshire cow, indeed, has always been a favourite with the London dairymen; but, formerly, when dry, she fattened slowly, consumed much food, and therefore sold to a disadvantage: but the improved breed fattens with surprising rapidity, and whether the dairyman keep his cows one year or three, and then sells them, or feeds them for the butcher, they return a profit.

The short-horns of Holderness, and, indeed, of Yorkshire generally, owe their modern improvement to judicious crossings, and especially to the influence of the Teeswater and Alloy strains. It must not, however, be supposed that the old breed is universally improved; on the contrary, many of the dairy-farmers give the rough breed the preference, partly from prejudice, and partly because the milking properties of the improved breed have been more or less sacrificed to the


W.E. HODGKIN SC.

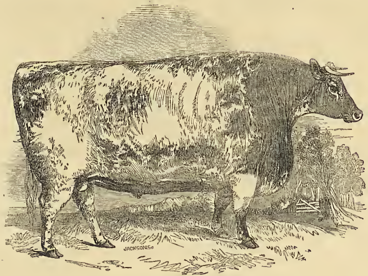
SHORT-HORN COW.

development of a constitutional tendency to the accumulation of fat. Mr. Youatt, referring to this subject, well observes, "Experience has gradually established the fact, that it is prudent to sacrifice a *small* portion of the milk to assist in feeding, when the cow is too old to continue in the dairy, or when, as in the neighbourhood of large towns, her services as a dairy cow are dispensed with at an early age. This cross being judiciously managed, the diminution of milk is so small, and the tendency to fatten so great, that the opinion of Mr. Sale is correct:—'I have always found in my stock, that the best milkers, when dried for feeding, make the most fat in the least time.' This is a doctrine which will be better understood and universally acknowledged by-and-by, for many of the improvers of the short-horns have but half done justice to their excellent stock. He would deserve well of his country who, with skill and means sufficient, would devote himself to the illustration of this point."

It is a remarkable fact, that the short-horned cow improves both in the quantity and quality of her milk as she grows older; that is, a cow of six years of age is superior, as a milker, to one of two or three years of age; and her milk will yield more butter in proportion. The milk of a single cow, on which the experiment was made, returned 373 lbs. of butter, in the space of thirty-two weeks; the lowest weekly amount being seven pounds, the highest sixteen. Her milk, during the time, averaged nearly twenty quarts per day; her food was grass and cut clover until the turnip season; but the pasture was not of first-rate quality. With abundant proofs of the value of the short-horns as milkers, it is the breeder's interest not to neglect this point, which is compatible with every property he can desire.

The weight to which some of the improved short-horns have been fed is astonishing. The "Durham Ox," when slaughtered, was 165 imp. st. 12 lbs. the four quarters, besides yielding 11 st. 2 lbs. of tallow; the hide weighed 10 st. 2 lbs. His age was eleven years. Many high-fed oxen, at three or four years of age, weigh from 100 to 120 stone the four quarters, and some much more.

One of the most extraordinary oxen of the pure short-horn breed, was an animal fed in Lincolnshire by Lord Yarborough, and exhibited under the erroneous appellation of the "Lincolnshire Ox;" he measured 5 feet 6 inches in height at the shoulders, 11 feet 10 inches to the root of the tail, 11 feet 1 inch in girth, and 3 feet 3 inches across the hips, shoulders, and middle of the back. His breast was only 14 inches



DURHAM OX.

from the ground. The depth of the fore quarters, and the comparative shortness of the limbs, are characteristics of this high-bred strain.

The short-horns are in the present day everywhere spreading, and their value is generally appreciated; it may reasonably be expected that in a few years they will either supersede or greatly modify the old breeds of most of the English grazing and breeding districts. Crosses between the Durham bull and Devonshire cow have proved in all respects admirable; their quality of flesh, aptitude to fatten, and milking properties being first-rate, while, at the same time, they exceed the pure Devons in size.

Amongst the most celebrated breeders of improved short-horns since the days of the Messrs. Collins, we may enumerate Mr. Booth, Rev. H. Berry, Mr. Bates, Sir H. V. Tempest, the late Earl Spencer, and many others who ably kept up the character and excellence of the improved short-horned breed of cattle. The late Mr. Bates of Kirklevington, deserves particular mention, both from the improvements he made in the breed, and for his success in obtaining prizes at the meetings of the Royal Agricultural Society, and elsewhere. At his sale in 1850, some of the best animals made extraordinary prices. Fourteen lots of the Duchess blood (descended from the heifer Duchess, purchased by Mr. Bates at Collins's sale, in 1810) averaged upwards of £116 per head. But even these high prices were eclipsed at the more recent sale at Tortworth, of the late Lord Ducie's herd. Nine animals descended from Chas. Collins's young Duchess, averaged 462 guineas apiece; and the gross amount of the sale of 62 lots was £9,361. 16*s.*; averaging upwards of £150.

Associated with Lord Ducie, as distinguished breeders of short-horned cattle, are Sir C. Knightley, Sir C. Tempest, Captain Barclay (Ury), Messrs. Kirknam, Torr, Topham, Beasley, and more recently still may be enumerated the names of Tankery, Stratton, Bowley, Marjoribanks, Towneley, &c. Amongst the aristocracy may be named the Duke of Devonshire, Lord Hill, Lord Burlington, Colonel Kingscote, and many others whose names are prominently before the public at our national and local exhibitions of cattle, as successful contributors at these meetings.

The value placed upon this important breed of cattle in foreign lands, is evidenced by the eagerness with which the best animals are bought up at extreme prices, for importation to almost every part of Continental Europe, as well as America and the far-distant shores of Australia.

There is in Lincolnshire a breed of short-horns, well known in the London markets as "Dutch cattle," or "Lincolns," which present us with none, or but few, of the characteristics of the high-bred Durham or Holderness breeds; they are large-boned, coarse, and heavy in the head; with the limbs high, and the loins and hips wide: the meat is coarse-grained, and the fat not well laid on. The cows, as milkers, are moderate: they are mostly white and red; but a dun variety is also to be seen, which was introduced by Sir C. Buck, of Hanby Grange, about the middle of the last century. This dun stock appears to be of mixed origin.

We must not suppose that no improvements have been effected in the coarse Lincolnshire breed; on the contrary, several successful attempts have been made, and particularly by crosses with the Durham, by means of which the size of the bone, and the ungainly form, were materially altered for the better; while a disposition to fatten more rapidly also resulted. These crossed Lincolns are, therefore, far more valuable than those of the old strain, but still are deficient in the fineness of the grain of the meat.

Besides these, there is an improved breed called the "Turnills," from the name of its founder, Captain Turnill, of Reesby-on-the-Wold. Whether he effected his object by crossing with some other breed, or simply by a judicious selection of the native stock, is not well known; but, certainly, he was very successful, and produced an animal lighter in the head, finer in the form, far less bony, less high on the limbs, fuller in the breast, and round in the barrel. Their general contour is good, and they evince a propensity to fatten rapidly. Some of the Lincolnshire farmers still prize and cultivate this breed, which has excellent grazing qualities, the oxen soon becoming ripe for the market, especially when put up for stall-feeding,—a plan which seems to suit them admirably. They are generally bought at the age of three years, in a lean state, by the jobbers or the graziers, and are ready for the butcher in the course of the ensuing summer or autumn.

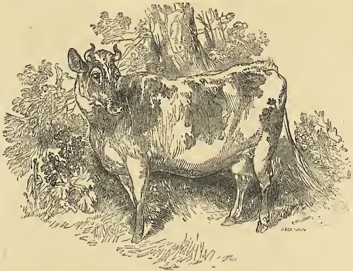
Lincolnshire, besides its own breed, presents us with various others: many Irish cattle are fed there, as well as cattle from the north, and also from Yorkshire and Durham; destined mostly for London. The farmers, who look to dairy qualities, have mixed breeds of almost every description; which answer their purpose very well, being, in general, good milkers.

The Normandy, Guernsey, or Alderney cattle, which, though originally from the French continent, are now naturalized in our island. These cattle prevail in Hampshire, especially near the coast; but, inland, are crossed with other breeds, and, perhaps, most successfully with the Devons, both as respects milking and feeding qualities.

The Alderney cattle are angular, and awkwardly shaped,—of small size, thin-necked, small-boned, with high shoulders, hollow behind, short in the rump, with pendent bellies, and a voracious appetite. The cows yield only a small portion of milk, but it is of the most extraordinary richness; and, on this account, they are often kept in the parks and pleasure-grounds of the opulent, where, we must confess, they are both useful and even ornamental. Their gentleness, their diminutive size, and even their singular contour, together with the excellence of their milk, render them favourites, where no remunerating return for their keep is expected or desired. We own that we admire them; but, perhaps, some old associations influence our feelings. In proportion to the quantity of milk, the butter it yields is astonishing; a single cow has been known to give nineteen pounds of butter weekly for several successive weeks. This, of course, is a very rare and remarkable occurrence; the average is from six to eight or nine pounds weekly, during the season, supposing the cow to be first-rate of her kind.

Meagre as the Alderney cow is when in milk, and unlikely as she may appear in the eyes of the grazier, it is nevertheless a fact that, when dried, she fattens with great rapidity. This property in the ox is very valuable; and though fat Alderney cattle are not often seen in the London market, some have been occasionally exhibited at the Smithfield Cattle Show. One exhibited in 1802 by the Duke of Bedford weighed (the four quarters) 95 st. 3 lbs., exclusive of inside fat, which was 17 st. 3 lbs., Smithfield weight (8 lbs. to the stone).

The Alderney cattle are generally of a mingled white and sandy-red, or fawn-colour; the latter being mostly disposed in large abrupt patches.



ALDERNEY COW.

CHAPTER II.

THE MANAGEMENT OF CATTLE.—THE DAIRY.

We may offer a few remarks on the principles by which the breeder ought to be guided in the successful management or improvement of his stock, in whatever points he wishes it to excel, whether in those required by the grazier or the dairy-farmer. Every man, whether grazier or dairy-farmer, is desirous of turning his cattle to the most advantage; nor can this be done, unless the size of the farm, the soil, climate, the produce, and the nature and extent of the pasturage, be well considered; for the cattle that the farm is best adapted for maintaining will be the most profitable. It is, however, essential, whatever the cattle be, whether for the purpose of the dairy, or for the immediate supply of the markets with their flesh, that they be well bred, and excellent of their kind. To the dairy-farmer, the most important points are, the quantity of milk yielded, its quality, its value for the production of butter, or of cheese, a freedom in the cows from vicious habits and ill temper, their character as good and healthy breeders, the ease with which, when useless as milkers, they become fattened for the market, and the nature and quantity of food requisite for this purpose. To the grazier, the quickness of becoming fat, and at as little expense as possible, the fineness of the grain of the meat, or of the muscular fibres, the mode of laying on the fat, the smallness of bone, soundness of constitution, and congeniality with the soil and the climate, are the chief points which he takes into consideration. If he is wise he will never stint keep, nor transfer his stock from a good to an indifferent soil; and this is true also with respect to the dairy-farmer.

Contour, or beauty of form, is desirable; indeed, it is more or less connected with what may be termed utility of form, that is, a preponderance of those parts in the beast which are most delicate for the table, and bear the highest price, over the parts of inferior quality, or offal. This is connected with smallness of bone, but not a preternatural smallness, and with a tendency to depositions of fat, which, however, should not be carried to an extreme, otherwise the quantity of flesh is disproportionate, and its fibre is dry and insipid; nor is the weight of the beast proportionate to its admeasurement. Previously to the time of Mr. Bakewell,* the cattle in general were large, long-bodied, big-boned, flat-sided, slow to fatten, great consumers of food, and often black, or foul-fleshed, or, as it is called in Yorkshire, "lyery." This truly patriotic breeder, acting upon true principles, energetically set to work upon the improvement of cattle, and, in defiance of opposition and a thousand difficulties, lived to see the success of his long-continued efforts. Experience and a close and acute observation had taught him that "like produces like;" in other words, that the qualities of the parents, such as beauty, or utility of form, disposition to fatness, goodness of flesh, abundance of milk, and even temper, were inherited by their offspring; and that by careful selections on the side both of the sire and dam, a breed might be ultimately established to which the title *blood* could be distinctly applied. This, of course, supposes a primary selection, then a selection of such of the offspring as exhibited the properties which constituted their perfection, in the highest degree; and again of the offspring of these, and so on progressively. At first, Mr. Bakewell was necessitated to breed in and in, but as his stock increased, he was enabled to interpose more or less remote removes between the members of the same family; and ultimately he established the Dishley, or new Leicester long-horns, a breed remarkable for smallness of bone, roundness of form, aptitude to fatten upon a moderate allowance, and fineness of flesh. But while he accomplished this, rendering the animals admirably suited for the grazier, it was found that their qualities as milkers were much deteriorated; the dairy-farmers consequently retained their old breed, noted for the richness, though perhaps not the great abundance of the milk. We are not here speaking about the differences or the distinguishing excellences of the various breeds of cattle, but of the principles upon which excellences, it matters not of what sort, may be obtained. "Like produces like," and both parents must present the same excellences, the same characteristics. It was by following out these rules that Mr. Bakewell arrived at perfection in his breed; indeed by some he is thought to have pushed his principles too far, and the following remarks have perhaps some justice in them:—"It was his grand maxim, that the bones of an animal intended for food could not be too small; and that the fat, being the most valuable part of the carcass, could not, consequently, be too abundant. In pursuance of this leading theory, by inducing a preternatural smallness of bone, and rotundity of carcass, he sought to cover the bones of all his animals externally with masses of fat. Thus the entirely new Leicester breed, from their excessive tendency to fatten, produce too small a quantity of eatable meat, and that, too, necessarily of inferior flavour and quality. They are, in general, found defective in weight, proportionally to their bulk; and if not thoroughly fattened, their flesh is crude and without flavour; while, if they be so, their carcasses produce little else but fat, a very considerable part of which must be sold at an inferior price, to make candles instead of food: not to forget the very great waste that must ever attend the consumption of over-fattened meat.

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* Born at Dishley, in Leicestershire, 1725. His father and grandfather resided on the estate before him.

"This great and sagacious improver (Mr. Bakewell) very justly disgusted at the sight of those huge, gaunt, leggy, and misshapen animals with which his vicinity abounded, and which scarcely any length of time, or quantity of food, would thoroughly fatten, patriotically determined upon raising a more sightly and profitable breed; yet, rather unfortunately, his zeal impelled him to the opposite extreme. Having painfully, and at much cost, raised a variety of cattle, the chief merit of which is to make fat, he has apparently laid his disciples and successors under the necessity of substituting another that will make lean."—*Illustrations of Natural History*, p. 5.

Granting the truth of these strictures, which we scarcely can, to the full extent, what is the inference as it respects the system of breeding? Namely, this: that by pursuing the proper mode, by proper selections, and by joining like excellences and properties in the sire and dam, and not by rashly crossing distinct breeds, but by making one breed the great foundation, and working upon it, remembering that "like produces like," not only will the point aimed at be attained, but it may even be overshot, thus demonstrating the power which the judicious breeder possesses.

Since Mr. Bakewell's time, the New Leicester breed has become degenerated; by some the stock has been bred in and in too closely, and by others very injudiciously crossed, In the mean time the short-horned breeds of cattle have been gaining an ascendancy, so that few really excellent long-horns are now to be seen. This, however, has nothing to do with the great principles we have endeavoured to illustrate; they apply alike to all breeds of cattle. Every breeder, then, should well consider the properties of the stock from which he breeds, investigate their good qualities and their bad qualities, and while he endeavours to keep up or improve the former, he should study to remove the latter. His selection must be strict; the heifer or cow should have as few of the bad points as possible, every excellence in perfection, and be in good health; the bull should be of the same kind, and if related, only in a remote degree; nor should he have been brought up on a pasturage differing from that of the cow, or under the influences of a different local climate; he should not only possess the good points *desired*, in all their perfection, but he should also have the points which the farmer considers to be the excellences of his own stock, as admirably developed. Thus acting with judgment, he may expect improvement; and if he fail, there is some concealed fault which has been overlooked, either on the one side or the other, or some defect in their parents, and which (in accordance with the tendency there is in families to exhibit, from time to time, certain peculiarities, latent perhaps for a generation) has again made itself manifest; consequently, on both sides there ought to be what is termed "good *blood*." But this is to suppose a stock already improved to a great extent; and here we may repeat the injunctions laid down by the Rev. H. Berry, which more particularly apply to the farmer commencing *de novo*. "A person selecting a stock from which to breed, notwithstanding he has set up for himself a standard of perfection, will obtain them with qualifications of different descriptions, and in different degrees. In breeding from such he will exercise his judgment, and decide what are indispensable or desirable qualities, and will cross with animals with a view to establish them. His proceeding will be of the '*give and take kind*.' He will submit to the introduction of a trifling defect in order that he may profit by a great excellence; and between excellences perhaps somewhat incompatible, he will decide on which is the greatest, and give it the preference.*

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* "A person would often be puzzled; he would find different individuals possessing different perfections in different degrees:—one, good flesh, and a tendency to fatten, with a bad form; another, with fine form, but bad flesh, and little disposition to acquire fat. What rule should he lay down, by the observance of which good might be generally produced, and as little evil as possible effected? UTILITY. The truly good form is that which secures constitution, health, and vigour; a disposition to lay on flesh with the greatest possible reduction of offal. Having obtained this, other things are of minor, though perhaps of considerable importance."—*Prize Essay*, by the Rev. H. Berry.

"To a person *commencing* improvement, the best advice is to get as good a bull as he can, and if he be a good one of his kind, to use him indiscriminately with all his cows; and when by this proceeding, which ought to be persisted in, his stock has, with an occasional change of bull, become sufficiently stamped with desirable excellences, his selection of males should then be made to eradicate defects which he thinks desirable to be got rid of.

"He will not fail to keep in view the necessity of *good blood* in the bulls resorted to, for that will give the only assurance that they will transmit their own valuable properties to their offspring; but he must not trust to this alone, or he will soon run the risk of degeneracy. In animals evincing an extraordinary degree of perfection, where the constitution is decidedly good, and there is no prominent defect, a little close breeding may be allowed; but this must not be injudiciously adopted, or carried too far; for, although it may increase and confirm valuable properties, it will also increase and confirm defects; and no breeder need be long in discovering that, in an improved state, animals have a greater tendency to defect than to perfection. Close breeding from affinities impairs the constitution and affects the procreative powers, and therefore a strong cross is occasionally necessary."

The dairy-farmer, however, is less concerned in this high breeding than the grazier; yet he is not by any means indifferent in the matter; for his aim ought to be, to obtain a breed no less valuable as milkers than for their disposition to fatten when the milk is dried. These two qualifications are not to be attained very easily; yet they may be, and, indeed, have been attained, and especially among the improved short-horn breeds, as those of Durham and Yorkshire, or the cross-breeds between the old Shropshire and the Holderness. The breeds most valued in the great dairies around the metropolis are mixed between the Yorkshire, Holderness, and Durham. For quality and quantity of milk they are eminent; they yield, on the average, each cow, a gallon of milk per day, and often nine quarts; and when dry, they are in general readily fattened for the butcher.

With respect to the points of symmetry in cattle, of which the various breeds exhibit several degrees of modification, there are certain rules which are generally acknowledged as applicable to good cattle of all kinds.

The Bull.—The forehead of the bull should be broad and short, the lower part, that is, the nasal part and jaws, tapering; and the muzzle fine; the ears moderate; the neck gently arched from the head to the shoulders, small and fine where it joins the head, but boldly thickening as it sweeps down to the chest, which should be deep, almost to a level with the knees, with the briskets well developed. The shoulders should be well set, the shoulder-blades oblique, with the humeral joint advancing forwards to the neck. The barrel of the chest should be round, without hollowness between it and the shoulders. The sides should be ribbed home, with little space between them and the hips; the whole body being barrel-shaped, and not flat-sided. The belly should not hang down, being well supported by the oblique abdominal muscles, and the flanks should be round and deep. The hips should be wide and round, the loins broad, and the back straight and flat. The tail should be broad and well-haired, and set on high, and fall abruptly. The breast should be broad; the forearms short and muscular, tapering to the knee; the legs straight, clean, and fine-boned. The thighs should be full and long, and close together when viewed from behind. The hide should be moderately thin, with a mellow feel, and movable, but not lax; and it should be well covered with fine soft hair. The nostrils should be large and open; the eyes animated and prominent; the horns clean and white.

THE OX.—In the ox, the masculine characters, so prominent in the bull, are softened; the neck is carried nearly straight from the top of the shoulders, without an arch; and the general frame is lighter, but the points of excellence are the same.

THE COW.—Cows of a coarse, angular, gaunt figure may give good milk, and that in abundance, as, indeed, was the case with some of the old unimproved breeds; but it is desirable, and moreover it is possible, to unite qualities as a milker with such an aptitude to fatten as will render her valuable when dry, and profitable to the butcher. In a cow thus constituted, the head must be long, rather small and fine; the neck thin and delicate at its junction with the head, but thickening as it approaches the shoulder and descends to the chest; the breast should be at least moderately broad and prominent, with a small dewlap; the chine should be full and fleshy; the ribs well arched, and the chest barrelled; the back straight, the shoulders fine, the loins wide, the hips well formed and rounded, the rump long; the udder should be moderate, with a fine skin, and of equal size both before and behind; the teats should not be too large or lax, and they should be equidistant from each other. If the vascular system be well developed, the milk-vein, as it is termed, is generally large; and though this vein is not connected with the udder, but carries the blood from the foreparts to the inguinal vein, still it has been taken, and with some justice, as the criterion of a good milker. The eyes should be clear, calm, and tranquil, indicative of a gentle temper; the skin thin, but mellow; and the hair soft. Cows thus admirably formed will often yield from twenty to twenty-four quarts of milk daily, and some, in the spring time, in good pasturage, even thirty, or more. The milk may, perhaps, yield less butter in proportion than that of some other breeds of cattle; but it would appear that, as the cow advances in age to her sixth and seventh year the milk becomes richer; and it is well known that the extensive dairymen of London prefer a cow which has had a third or fourth calf, and is five or six years old, to a younger animal.

We are perfectly aware that Mr. Culley ("Observations on Live Stock") considers it as an impossibility to unite good milkers with good feeders; for, he says, whenever we attempt both, we are sure to get neither in perfection:—"In proportion as we gain the one, in the same proportion we lose the other: the more milk, the less beef; and the more we pursue beef, the less milk we get. In truth, they seem to be two different varieties of the same kind, for very different uses; and if so, they ought most certainly to be differently pursued by those who employ them. If the dairyman wants milk, let him pursue the milking tribe; let him have both bull and cows of the best and greatest milking family he can find; on the contrary, he that wants feeding or grazing cattle, let him procure a bull and cows of that sort which feed the quickest, wherever they are to be found. By pursuing too many objects at once, we are apt to lose sight of the principal; and by aiming at too much, we often lose all. Let us only keep to distinct sorts, and we shall obtain the prize in due time. I apprehend it has been much owing to the mixing of breeds and improper crossings that has kept us so long from distinguishing the most valuable kinds." Mr. Culley wrote in 1807, and since his day many improvements have taken place in the breeds of cattle; and experience has proved that the improved Yorkshire cow, in which the characters of the Durham and Holderness are mingled, unites the two qualities in high perfection.

Reproduction.—The heifer ought not to be allowed to breed until turned two years old; the reason is obvious: her own system, before this period, is not sufficiently matured for the tax upon it—a tax which will be paid, not only by the dam, but also by her progeny, for both will suffer from a deficiency in nutriment, the whole of which is necessary for the growth of the former, which, during the second year, is rapid. If the bull be kept separate from the herd of cows, the farmer may regulate the succession of calves almost at pleasure, so as to suit his pasture, or his arrangements. The best time, as it respects the mother, the calf, and the free supply of milk, is when the spring grass is beginning to shoot luxuriantly, affording a good and sufficient store of nutriment. It is true that veal and butter yield a better profit at an earlier period, but the breeder must judge in points of this nature from circumstances.

The period of gestation in the cow is generally stated as nine calendar months, or 270 days; but there is often considerable variation of time. M. Tessier observes (in a memoir read to the Royal Academy of Sciences in Paris), that the shortest period, as far as his opportunities of observation enabled him to ascertain, was 240 days, the longest 321; the difference being eighty-one days.* This range of time is very extraordinary, and appears to depend on the care paid to the animal, and on its state of health; by which the development of the calf is influenced through the sanguiferous system of the mother.

With respect to the bull, he does not attain to a due degree of strength till two years old, and is in higher vigour at three; but how long the breeder may keep him after that age must depend upon his own judgment, and a variety of circumstances.

The cow seldom produces more than a single calf, sometimes, however, twins, and very rarely three. In the case of twins, if they be respectively male and female, the female is generally, but not always, unproductive.

We now proceed with details descriptive of the management of cattle, under the heads of rearing and fattening. The first object being to secure a suitable breeding stock, and a provision for proper buildings for their accommodation and shelter.

It is most advantageous to have the calves drop in the early part of the year, that the young grass may be ready for them about the time of weaning. New milk is best for the young calf for the first fortnight, when it may be trained to feed upon other food, such as linseed-cake, sweet hay; and when it will eat freely of these, its allowance of milk may be gradually reduced, and sliced swedes or carrots added to its food. The cribs should be kept clean, the food regularly supplied, and the calves themselves should always receive kind and gentle treatment. Perseverance in such management will greatly aid the growth of the young animals; when kindly treated, there will be no restless excitement on the approach of strangers, and they are easily managed when surgical operations become necessary from disease or accident. All graziers are fully alive to the importance of docility in all fatting animals.

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* In the *Bulletin des Sciences*, by the Soc. Philomatique, Paris, 1797, M. Tessier says, that out of 160 cows, some calved in 241 days, and five in 308; giving a latitude of 67 days.—See Sir E. Home's Paper on Phil. Trans. Part I. for 1822.

After three or four weeks the male calves may be castrated, an operation attended with less risk and pain when done at an early age. It is advisable to keep the calves in separate cribs until five or six weeks old, after which they may be turned together into a comfortable house, with sufficient room for exercise. And when the pasturage permits, and fine weather is well established, they may be turned out, at first for a few hours only in the middle of the day, to inure them to the change. As winter approaches, they must again have the shelter of a comfortable yard, and be supplied with roots mixed with straw-chaff. An addition of about 1 lb. of oilcake in summer, and 2 lbs. to their ordinary food during winter, will greatly assist their condition and early maturity. The yards should, of course, be well sheltered and littered, and cattle of the same age and size have separate enclosures, otherwise the weaker beasts will be driven about by the master ones. In the spring the young cattle are again turned to grass, and the treatment continues in a similar manner until the cattle are fattened off at home, or are sold off for that purpose into other districts. By liberal feeding whilst in a young state, the cattle are kept in good condition and rapid growth.

For carrying out the fatting process, several distinct methods are practised in different parts of the country. In Norfolk and Suffolk, from whence Smithfield draws its great supply of winter-fed oxen, and also in the North until lately, the almost universal practice was to fatten cattle in open yards, with shelter sheds; in the North the food was merely turnips and straw; but the more liberal system of the eastern counties is now very generally adopted, and purchased food in the shape of oilcake and meal from pulse and grain is now added to the turnips. The profit from the use of these artificial aids in feeding being derived from the additional weight of beef, and from the improved quality of the manure. Formerly, turnips, *ad libitum*, were given to fatten cattle, often at the rate of 2 cwt. to each ox per day; but it has been found that an allowance of half that quantity, or less, mixed with straw-chaff, is better than the larger quantity of roots, artificial food of course being added.

The fatting cattle in stalls, and more recently in loose boxes, as introduced by Mr. Warnes, has been recommended, and adopted, in preference to feeding in open yards. One of the most important facts to be taken into consideration, in deciding whether yards, stalls, or boxes are best adapted for fatting cattle is the discovery by agricultural chemists, that a considerable portion of the food consumed by cattle is expended in maintaining the heat of their bodies. Professor Playfair remarks on this subject—"We shall find that warmth is equivalent to food, and that the most favourable conditions to the development of fat are warmth and want of exercise." Hence it is quite evident, that if cattle are exposed in open yards to the weather in winter, both the fattening process must be retarded, and a large additional quantity of food be consumed to keep up the animal heat.

Among other objections which militate against the use of open yards it may be mentioned, that the manure is not so well made as in boxes; the cattle are exposed to the frequent changes of temperature that constantly occur in this variable climate, and they are exposed to disturbances from the master beasts driving the weaker ones from their food. Stalls have some of the advantages which are wanting in yards, but the manure is not well made, and the cattle have no means of exercise.

Altogether we must give a decided preference to boxes, and to what has been recommended very strongly, to covered yards, which can be boxed off in small feeding enclosures; in these the cattle have sufficient exercise, are secure from extremes of cold, and, if properly ventilated, of heat also, and the manure made is superior to that made either in yards or stalls.

The food of fatting cattle varies with the time of year. The Norfolk and Suffolk graziers commence feeding in the autumn upon white turnips, to be followed by swedes; and in the spring mangold-wurzel becomes the staple article of food. The roots may be cut fine or grated with any of the machines now introduced for this purpose, and mixed with chaff to give bulk to the food; and this may be supplemented with oilcake, or meal from pulse or linseed, the quantity of the latter allowed to each beast being small at first, and gradually increased as the animal advances in condition. A small quantity of good hay may be given at night. To prevent waste, the food should be given in small quantities, and the feed and water troughs kept well cleaned out. Litter should be regularly supplied, and the brush and curry-comb may be used, and add much to the comfort and cleanliness of house-fed cattle.

When summer feeding is carried on, tares, clover, or rye-grass take the place of the root crops; some graziers cut these up into chaff with a proportion of straw. In summer grazing, much attention is required to keep the sheds cool and well ventilated.

The cow, as we have said, should be suited to the pasturage; but on the plan of stall-feeding, or feeding on cut green food in a small inclosure, the cottager may keep a superior animal, which, properly fed on succulent diet, will yield a considerable quantity of milk, and, when aged, sell for a good price. Generally speaking, a cow may be milked to within a month of her calving, which should occur in April or May. She should then be suffered to become dry; otherwise, when she calves, her new milk will be deficient both in quantity and quality. The calf should have the first milk, which nature has intended to clear the intestines of a glutinous substance, which is always present in the new-born animal.

Besides plenty of succulent green food, the milch cow requires good water, and that which has been for some time exposed to the air is the best; cleanliness is also indispensable; a little rock salt to lick may be occasionally allowed, or a little salt given, as conducive to health. At the time of calving, or rather after calving, a little warm water, with some barley or bean-meal mixed with it, will be gladly received; but drenches and medicines should be avoided. Indeed, when a cow is allowed to take proper exercise in the open air, and has a snug shelter or house to resort to in case of stormy weather, heavy rain, or cold, she will generally keep in good health, and recover easily after calving. We suppose the food to be given regularly, and in moderate quantities at a time. Occasionally, cows are apt to show symptoms of jaundice, the result of some disturbance in the function of the liver; the eyes and even the skin assume a yellowish tint, and the animal is languid, and ceases to feed with an appetite. An aperient draught composed of half-a-pound of Glauber salts, an ounce of ginger, and two ounces of treacle, with two quarts of boiling water poured over them, may be given slowly and gently when milk-warm, and repeated every other day. The cow should be kept from chilly winds, and, if it be winter, have the loins covered with a cloth, and be confined in her shed. This plan will generally prove successful in a short time. We would, however, recommend the cottager to get rid of a sickly cow as soon as possible; for should she have some chronic disease, her milk will not only diminish in quantity, but be bad in quality; and she may die suddenly, and thus prove a great loss; whereas, though he may lose by selling her, he will find his first loss the least in the end. A staring coat, a tight skin, loss of appetite, difficulty of breathing, a husky cough, and general leanness, are indications of disease in the lungs, or liver, or both; and the sooner she is parted with the better.

It is a common custom to breed from heifers at too early an age; this is to spoil the cow. The heifer should not be under two years old when taken to the bull; and even then it is as well to let her go dry sooner than older cows; indeed, if she be younger, this is imperative; for the tax upon the immature animal by the calf she has borne, and the drainage of the milk from the system subsequently, tend to arrest her growth and due development. A young heifer, moreover, cannot be expected to produce a fine calf.

The above observations apply more particularly to the poor industrious cottager, who, with small means at command, wishes to keep a cow on the best plan: he has no extent of grazing land; commons generally afford but scanty food, and are for the most part overstocked; besides, he may not have the opportunity of availing himself of a common; and the plan of road-side and by-lane grazing cannot be commended, even on the ground of the habits of idleness entailed upon the boy who spends his day in watching the animal, and driving her from one spot to another, or from ditch to ditch, where the bank holds out a prospect of a tolerable supply. But if the cottager can rent a small piece of ground and has time to cultivate it himself, so as to make it produce greater crops of rye, tares, clover, lucern, cabbages, beet-root, potatoes, and turnips, to be raised in succession and cut for his cow, confined in a cow-house, except while taking exercise in her little paddock, or perhaps a small orchard, he may certainly make it answer his purpose. If near a large town, he will be sure to have a certain sale for all his milk. His own family will need a supply; but from this the cream may be taken, and sold to advantage. He may find it advantageous to make butter; which, as fresh butter sells, ought to bring in a return of ten or twelve pounds per annum, leaving the buttermilk for the use of the family, the rearing of a calf, and the fattening of a hog. After all, however, the affirmative to the question, whether it is profitable for the cottager to keep a cow, will depend on the contingencies of locality; the spare time he has on his hands; the assistance his family can render him; the facilities of disposing of the produce to advantage; and the amount of primary outlay he must necessarily encounter; together with the rent of the ground. Where a cottager depends solely on a small piece of land for the support of himself and his family, and for the payment of rent, then indeed his cow is of the utmost importance, if managed with anything like regularity on a judicious system. It must always be recollected, that cows on poor, though extensive pasturage, give but little milk; that no considerable produce can be expected, be the cow what she may, unless she is supplied with a sufficiency of good succulent food; and that when a man owns only a small plot of ground, this can only be produced by a well-ordered system of crops in rotation. "If," says a writer, "a labourer, who has an allotment of half an acre of good light land, would entirely devote it to raise food for a cow,—his wife and children cutting the food, and tending the cow in a small yard with a shed, or in any cow-stall (he would find that he had much greater clear profit than if he had sown his land every year with wheat, and had always a good crop, which last supposition is impossible),—there would be no better stimulus to industry than to let a piece of land for this purpose to every man who could purchase a cow, and feed it by *soiling*."

We may here add, that the green food should be cut twelve or twenty hours before it is given to the cattle, and not wet with dew or rain; it should be supplied at intervals, and in moderation, as horned cattle are apt to feed voraciously, and the fresh green food is liable to ferment in the paunch, endangering the animal's life from the gasses evolved, which distend the abdomen prodigiously. It is but lately that we saw a fine cow which died from this cause: she was left safe in her paddock in the evening, but during the night she contrived to get at some clover, or lucern, in an adjacent inclosure, of which she ate voraciously; in the morning she was found dead and swollen.

In the neighbourhood of London, where a prodigious supply of milk is demanded, vast numbers of cows, all (or almost all) short-horns, are kept upon the principle of soiling, or stall-feeding, for the sake of their valuable produce. We allude to those large establishments in which four or five hundred cows are kept, and where most of the retail dealers in milk obtain the measure they require. There are, indeed, numerous smaller establishments around London, in which the proprietor, who retails the milk on his own account, keeps from six to twenty, or five-and-twenty cows; and as he has to compete with the retailers who purchase their stock at the great establishments, he seldom resorts to the modes of adulteration, which are commonly practised by the ordinary retailers: not that a little water may not be added; but if this be all, the purchaser in London may be well contented. It is calculated that upwards of twelve thousand cows are kept for the supply of London and its increasing environs; and as the amount of milk returned by these cattle is mostly retailed by pennyworths or two-pennyworths, morning and evening, we shall readily conclude that the retailers' occupation is one of no little labour. That it is profitable we may conclude from the fact that "milk-walks" are not unfrequently advertised for sale; but whether the profit be truly fair or just may admit of question. Certain it is that the milk leaves the great dairy in its purity; but what admixtures it may afterwards undergo may require the analysis of the chemist to determine.

Mr. Youatt (whose name we have often mentioned, and to whose memory we pay a tribute of respect for his extensive acquirements and his private worth) says, in his agreeable style: "The name of new milk has something very pleasant about it, but it is an article which rarely makes its appearance at the breakfast or tea table of the citizen. That which is got from the cow at night is put by until the morning; the cream is skimmed off, and then, a little water being added, it is sold to the public as the morning's milk. This is the practice of most, or all of the little dairymen who kept their half-dozen cows; and if this were all,—and with these people it is nearly all,—the public must not complain. The milk may be lowered by the warm water, but the lowering system is not carried to any great extent; for there is a pride among them that their milk shall be better than that of the merchants on a yet smaller scale, who purchase the article from the great dairies; and so it generally is. The milk goes from the yard of the great dairy into the possession of the itinerant dealers perfectly pure; what is done with it afterwards, and to what degree it is lowered and sophisticated, is *known only* to these retail merchants."

In all dairy establishments, ventilation and cleanliness are indispensable; and if butter is made, the dairy proper, or butter-room, should be as near the cow-house as possible, as the milk suffers more or less considerably from being agitated, or too much cooled, before it is set for the cream to rise. The milk should be brought from the cows without being exposed to the outer air, before it is set to cream; which should be in vessels arranged on a stone slab, below the level of the ground; the apartment being sunk to the depth of three or four feet, and kept perfectly dry. The air may be admitted through perforated zinc plates, or woven-wire windows, placed opposite to each other, having shutters which may be opened or closed according to the temperature and state of the weather. Glazed windows may be added, and should be open, excepting in very hot or very cold weather. The situation should be dry, and well shielded from the north, east, and south.

Dairies in natural or artificial caves, which occur in some countries, with springs of water at hand, are admirable for coolness and uniformity of temperature, but in England we must not look for such advantages; nor are they needed. A verandah round a dairy is very useful; it shades the sun in summer, and is a protection against the cold and damp in winter. There should be a washhouse, with every convenience for hot water, for scalding the dairy utensils, and for warming milk; and if cheese be made as well as butter, a room with presses, and a cheese-room are also needed.

Butter is the fat or oleaginous part of the milk of various animals, principally of the domestic cow. The milk of the cow is composed of three distinct ingredients, the curd, the whey, and the butter; the two first form the largest portion, and the last the most valuable. The comparative value of the milk of different cows, or of the same cows fed on different pastures, is estimated chiefly by the quantity of butter contained in it; and in this respect some breeds of cows are far superior to others. The union of the component parts of milk is chiefly mechanical, as they separate by subsidence according to their specific gravities, the cream being the lightest, and the curd the heaviest; the curd, however, requires a slight chemical change for its separation from the whey, which at the same time produces a peculiar acid, called the lactic acid. From the moment that milk is drawn from the cow it begins to be affected by the air and changes of temperature, and circumstances almost imperceptible to our senses will materially affect its quality: hence the importance of extreme care in every step of the process of the dairy, especially in making butter.

The cows should be milked in the cool of the morning and evening; they should not be much driven immediately before milking, and it is best to bring them to the place of milking some time before the operation begins. In some situations it is better to milk them in the pastures and carry the milk home; in others to drive the cows gently to the cow-stall. In mountainous countries the first mode is generally adopted, because the cows are apt to leap down steep places, and shake the milk in their udder more than is done by carrying it in the pail. The same practice holds good in Holland from another cause, which is the distance of the pastures from the home-stall, and the facility of transporting the milk in small boats, all the best pastures being surrounded by small canals communicating with the greater; thus the milk may be carried several miles without the least agitation. In England, where the pastures frequently surround the habitation of the dairyman, the cows are generally driven home twice a day to be milked. As the slightest acidity or putrescence immediately causes an internal chemical action in milk, it is of the utmost importance that the place where the cows are milked, and the persons employed, should be of the greatest purity and cleanliness. The milking-house should be paved with stone or brick, and no litter or dung be permitted to remain there. It should be washed out twice a day, immediately before each milking. The teats of the cows should be washed clean with water and a sponge.

As soon as the milk is brought into the dairy, it is strained through a fine sieve or cloth, and it is then poured into shallow pans or troughs lined with lead. The best pans are of metal, either of iron, carefully tinned, or of brass. Such pans are cool in summer, and in winter allow of the application of heat, which is often very useful to make the cream rise. When leaden troughs are used, they are generally fixed to the wall, and have a slight inclination towards one end, where there is a hole with a plug in it, by drawing which the thin milk is allowed to run off slowly, leaving the cream behind, which runs last through the hole into the pan placed under to receive it. The milk in the pans or troughs is generally four or five inches in depth, which is found most conducive to the separation of the cream. The place where the milk is set should have a thorough draft of air by means of opposite wire windows. The sun should be carefully excluded by high buildings or trees, and the floor, which should always be of brick or stone, should be continually kept moist in summer, that the evaporation may produce an equal cool temperature. A small stove in winter is a great advantage, provided smoke or smell be most carefully avoided, and the temperature be carefully regulated by a thermometer. In Switzerland men are chiefly employed to milk the cows, and in all the process of the preparation of butter and cheese. The women only clean the utensils, and carry green food to the cows when they are kept in the stable. When the milk has stood twelve hours, the finest parts of the cream have risen to the surface, and if they are then taken off by a skimming-dish, and immediately churned, a very delicate butter is obtained; but in general it is left twenty-four hours, when the cream is collected by skimming, or the thin milk is let off by taking out the plug in the troughs. All the cream is put into a deep earthen jar, which should be glazed, but not with lead; stone ware is the best. More cream is added every day, till there is a sufficient quantity to churn, which in moderate dairies is every two days. It is usual to stir the cream often, to encourage a slight acidity, by which the process of churning is accelerated. This acidity is sometimes produced by the addition of vinegar or lemon-juice; but however this may facilitate the conversion of the cream into butter, the quality is decidedly injured by it, especially butter which is to be salted. It has been asserted by some authors that butter will not separate from the butter-milk until acidity is produced, and, no doubt, there is more or less of lactic acid in all butter-milk; but perfectly fresh cream, which has stood only one night and is churned early next morning, will generally produce excellent butter in a quarter of an hour or twenty minutes in summer, and no acid taste can be discovered in the butter-milk. The change by which the butter is separated in a solid form is accompanied by the development of heat in churning.

The common method employed to separate the butter from the thinner portion of the cream is by strong agitation. In small quantities this may be done in a bottle; but the common instrument is the *churn*, which is a wooden cask, rather wider at bottom than at the top, covered with a round lid with a hole in the centre. Through this hole passes a round stick about four feet long, inserted in the centre of a round flat board with holes in it; the diameter of this board is a little less than that of the top of the churn. Various improvements have been made in this machine. The cream should not fill above two-thirds of the churn. By means of this stick, held in both hands and moved up and down, the cream is violently agitated, passing through the holes in the board and round its edge every time the stick is raised or depressed, and thus every portion is brought into contact with the air. In the course of an hour's churning, more or less according to circumstances, small kernels of butter appear, which are soon united by the pressure of the board against the bottom of the churn, and form a mass of solid butter. The butter is collected with the hand, and placed in a shallow tub for the next operation. The butter-milk is set aside for the pigs, or for domestic use. The butter is still mixed with some portion of butter-milk, but much of its quality for keeping depends on their perfect separation. The most usual way is to spread it thin in a shallow tub, beating it with the hand or a flat wooden spoon, and washing it repeatedly with clear spring water, until all milkiness disappears in the water that is poured off. Some experienced dairymen pretend that the butter is deteriorated by much washing, and therefore they express the butter-milk by simply beating the butter with the hand, kept cool by frequently dipping it in cold water, or with a moist cloth wrapped in the form of a ball, which soaks up all the butter-milk, and leaves the butter quite dry. This operation requires the greatest attention, especially in warm weather, and no person should work the butter who has not a very cool hand. The less it is handled the better, and therefore a wooden spoon or spatula is much to be preferred.

When it is entirely freed from the butter-milk, and of a proper consistency, it is divided into portions of the weight required, if it is intended to be sold fresh. But the greatest part of the butter that is made, especially at a distance from large towns, is immediately salted and put into casks, which usually contain 56lbs., and are called firkins. The quality of the salt used is of great importance; if it be pure, the butter will keep its flavour a long time; but when it is impure, and contains bitter and deliquescent salts, the butter soon becomes rancid. The Dutch are very particular in this point. They use a kind of salt which is made by slow evaporation, and perfectly crystallized. The salt is intimately mixed with the butter. From 3lbs. to 5lbs. are sufficient for a firkin of 56lbs.* The casks are made of clean white wood.

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* The following mixture has been found superior to salt alone in curing butter.—half an ounce of dry salt pounded fine, two drachms of sugar, and two drachms of saltpetre, for every pound of butter.

They are carefully washed inside with strong brine made hot, and rubbed over with salt. The butter, being quite dry, is pressed close into the cask, a small layer of salt having been first put on the bottom. Every addition is carefully incorporated with the preceding portion. If there is not a sufficient quantity to fill the cask at once, the surface is made smooth, some salt is put over it, and a cloth is pressed close upon it to exclude the air. When the remainder is added, at the next churning, the cloth is taken off, and the salt, which had been put on the surface, is carefully removed with a spoon. The surface is dug into with a small wooden spade, and laid rough, and the newly-salted butter is added and incorporated completely. This prevents a streak, which would otherwise appear at the place where the two portions joined. When the cask is full, some salt is put over it, and the head is put in. If the butter was well freed from all the butter-milk, and the salt mixed with it was quite dry, it will not shrink in the cask, and it will keep its flavour for a long time. Should there be an appearance of shrinking, the cask must be opened, and melted butter poured round it so as to fill up the interstices between the butter and the cask. There is a mode of preserving butter for domestic use without salt, in the following manner :—The butter is set in a clean pan over the fire, and melted very gently; it is not allowed to boil, but is heated very nearly to the boiling point. Experience has shown this heat to be attained when the reflection of the white of the eye is distinctly seen on the surface of the butter on looking down into the pan. All the watery particles are then evaporated, and the curd, of which a portion always remains in the butter, and which is one cause of its becoming rancid, falls to the bottom. The clear butter is poured into an earthen vessel and covered over with paper, and a bladder or a piece of leather is tied over the jar to exclude the air. When it is cooled, it much resembles hog's lard. It has lost some of its flavour, but it is much superior to salt butter for culinary purposes, and especially for pastry.

The Devonshire method of making butter is peculiar to that county. The milk, instead of being set for the cream to rise, is placed in tin or earthen pans, holding about eleven or twelve quarts each. Twelve hours after milking, these pans are placed on a broad iron plate, heated by a small furnace. The milk is not allowed to boil, but a thick scum rises to the surface. As soon as small bubbles begin to appear, where a portion of this scum is removed with a spoon, the milk is taken off and allowed to cool. The thick part is taken off the surface, and this is called *clouted cream:* it is a sweet, pleasant substance, more solid than cream, but not so solid as butter, and is generally considered a dainty. A very slight agitation converts it into real butter, after which it is treated exactly as we have before described.

Another method of making butter, which is more generally adopted, is to churn the milk and cream together. This method is pursued in parts of Holland, Scotland and Ireland, and is said to produce a greater abundance of butter from the same quantity of milk. In the Dutch method the milk is put into deep jars in a cool place, and each *meal,* or portion milked at one time, is kept separate. As soon as there is a slight appearance of acidity, the whole is churned in an upright churn, which, from the quantity of milk, is of very large dimensions. The plunger is worked by machinery moved by a horse, or sometimes by a dog walking in a wheel, which he turns by his weight. When the butter begins to form into small kernels, the contents of the churn are emptied on a sieve, which lets the butter-milk pass through. The butter is then formed into a mass, as described before.

It is an acknowledged fact, that such are the niceties of the dairy that great experience alone can insure a produce of superior quality, and this experience would be more readily acquired if the circumstances were accurately observed and noted. We would recommend to those who have extensive dairies, to mark by the thermometer the temperature of the milk and cream in the different stages of the process; occasionally to test the acidity of the butter-milk by means of alkalis; and to note any peculiarity in the atmosphere by an electrometer. A few observations, carefully noted, repeated, and compared, would throw more light on the true causes which favour or oppose the production of good butter, than all the guesses that have hitherto been made.

The quality of the butter depends materially on the nature of the pasture. The best is made from cows fed in rich natural meadows. Certain plants, which grow in poor and marshy soils, give a disagreeable taste to the butter. The common notion that the yellow flower called the buttercup gives colour and flavour to butter is a mistake: cows never crop the flower if they can avoid it, and the whole plant is acrid and unpalatable. When cows are fed with cut grass in the stable, the butter is inferior, except in the case of some artificial grasses, such as lucern. Turnips and other roots given to cows in winter communicate more or less of a bad taste to butter, which is corrected in some degree by means of a small quantity of water and saltpetre added to the milk; and also, it is said, by giving salt to the cows with their food. But there is no butter made in winter equal to that which is made when the cows are fed entirely with good meadow hay, especially of the second crop, called aftermath hay, which contains few seed stalks.

The yellow colour of May butter is frequently imitated artificially, by mixing some ground anatto root, or the juice of carrots, with the cream. This is easily detected by the taste of the butter, which is not improved by it, and has not the peculiar flavour of fine grass butter; but in other respects it is a harmless addition. Some cows give a much yellower cream than others, especially the Alderney cows; and the butter made from it is of a peculiarly fine flavour. When a cow has lately calved, the milk is also much yellower, but this soon goes off, if it be not the natural colour; and the butter made by mixing this with other milk, although of a deeper colour, is not improved by it.

According to the accounts of the produce of butter from different countries and various breeds of cows, we may state that, on an average, four gallons of milk produce 16 ounces of butter; and to make the feeding of cows for the dairy a profitable employment in England, a good cow should produce six pounds of butter per week in summer, and half that quantity in winter, allowing from six weeks to two months for her being dry before calving; that is 120lbs. in twenty weeks after calving, and 80lbs. in the remainder of the time till she goes dry—in all, about 200lbs. in the year. If she produces more, she may be considered as a superior cow; if less, she is below par. To produce this quantity the pasture must be good, and if we allow three acres to keep a cow in grass and hay for a year, which is not very far from the mark, the butter made will produce about £10, at the distance of fifty miles from London, if it is sold in a fresh state, and the calf about 15*s*. at a week old. This does little more than pay the rent and expenses; the profit must be made by feeding pigs, or making skim-milk cheese.

The quality of the butter produced in England and in Holland is considered the best. A considerable quantity of Dutch butter is exported, but all that is produced in England is consumed at home, in addition to large quantities imported from Ireland and the continent of Europe. The quantity imported has been for some time progressively increasing.

CHEESE.

In the making of cheese there are certain general principles which are essential, but slight variations in the process produce cheeses of very different qualities; and although the most important circumstance is the nature of the pasture on which the cows are fed, yet much depends on the mode in which the different stages of the fabrication are managed; and hence the great superiority of the cheeses of particular districts or dairies over those of others, without any apparent difference in the pasture. In those countries where the cows are chiefly kept tied up in stalls, and are fed with a variety of natural and artificial grasses, roots, and vegetables, superior cheese is often made.

The first process in making cheese is to separate the curd from the whey, which may be done by allowing the milk to become sour; but the cheese is inferior in quality, and it is difficult to stop the acid fermentation and prevent its running into the putrefactive. Various substances added to milk will soon separate the curd from the whey. All acids curdle milk. Muriatic acid is used with success for this purpose in Holland. Some vegetables contain acids which readily coagulate milk, such as the juice of the fig-tree, and the flowers of the Galium verum, or yellow lady's bed straw, hence called *cheese-rennet.* Where better rennet cannot be procured, they may be substituted for the best curdler of milk, which is the gastric juice of the stomach of a sucking calf. This juice rapidly coagulates the milk as the calf sucks; and the only difficulty is in collecting and keeping it from putrefaction, which begins from the instant the stomach is taken from the calf. The preparation of the *rennet*, as it is called, is a most important part of the process of cheese-making. The following may be considered as the simplest, and perhaps the best. As soon as a sucking calf is killed, the stomach should be taken out, and if the calf has sucked lately, it is all the better. The outer skin should be well scraped, and all fat and useless membranes carefully removed. It is only the inner coat which must be preserved. The coagulated milk should be taken out and examined; and any substance besides curd found in it should be carefully removed. The serum left in it should be pressed out with a cloth. It should then be replaced in the stomach with a large quantity of the best salt. Some add a little alum and sal prunella; others put various herbs and spices, with a view of giving the cheese a peculiar flavour; but the plain simple salting is sufficient. The skins or vells, as they are called, are then put into a pan, and covered with a saturated solution of salt, in which they are soaked for some hours; but there must be no more liquor than will well moisten the vells. They are afterwards hung up to dry, a piece of flat wood being put crosswise into each to stretch them out. They should be perfectly dried, and look like parchment. In this state they may be kept in a dry place for any length of time, and are always ready for use. In some places, at the time of making cheese, a piece of vell is cut off, and soaked for some hours in water or whey, and the whole is added to the warm milk. In other places, pieces of vell are put into a linen bag, and soaked in warm water, until the water has acquired sufficient strength, which is proved by trying a portion of it in warm milk. The method employed in Switzerland is as follows:— A dry vell is taken and examined; it is scraped with a knife, and where any veins or pieces of tough membrane appear, they are removed. The whole surface is examined and washed carefully, if any dust or dirt has adhered to it; but otherwise it is only wiped with a cloth. A handful of salt is then put into it, and the edges of the vell are folded over and secured with a wooden skewer stuck through it. In this state it forms a ball of about three inches diameter, and is laid to soak twenty-four hours in a dish containing about a quart of clear whey, which has been boiled, and all the curd taken out. The next day the vell is well squeezed, and put into fresh whey; the first infusion being put into a proper vessel, the second is afterwards mixed with it, and bottled for use. Half a pint of this liquor, of a proper strength, is sufficient to curdle 40 gallons of milk. Experience alone enables the dairyman to judge of the strength of his rennet; for this purpose he takes in a flat ladle some milk which has been heated to about 95 degrees of Fahrenheit, and adds a small measure of rennet. By the rapidity with which it curdles, and by the form of the flakes produced, he knows its exact strength, and puts more or less into the caldron in which the milk is heated for curdling.

There are different kinds of cheese, according to the mode of preparing it: soft and rich cheeses are not intended to be kept long; hard and dry cheeses are adapted to be kept and stored for provisions. Of the first kind are all cream cheeses, and those soft cheeses, called Bath cheeses and Yorkshire cheeses, which are sold as soon as made, and if kept too long become soft and putrid. Stilton and Gruyère cheeses are intermediate; Parmesan, Dutch, Cheshire, Gloucestershire, and similar cheeses, are intended for longer keeping. The poorer the cheese is, the longer it will keep; and all cheese that is well cleared from whey, and sufficiently salted, will keep for years. The small Dutch cheeses, called Edam cheeses, are admirably adapted for keeping, and form an important article in the victualling of ships.

The Gruyère and Parmesan cheeses only differ in the nature of the milk, and in the degree of heat given to the curd in different parts of the process. Gruyère cheese is entirely made from new milk, and Parmesan from skimmed milk. In the first nothing is added to give flavour: in the latter saffron gives both colour and flavour; the process in both is exactly similar. A large caldron, in the shape of a bell, capable of holding from 60 to 120 gallons of milk, hangs from an iron crane over a hearth where a wood fire is made. The milk, having been strained, is put into this caldron, and heated to nearly blood-heat (95° to 100°). It is then turned off the fire, and some rennet, prepared as stated above, is intimately mixed with the warm milk by stirring it with the hand, in which is held a flat wooden skimming-dish, which is turned round in the milk while the hand and arm stir it. A cloth is then laid over the caldron, and in half an hour, more or less, the coagulum is formed. This is ascertained by pressing the skimming-dish on the surface, when the whey will appear on the part pressed. If it is longer than an hour in coagulating, the milk has been too cool, or the rennet not strong enough. When the curd is properly formed, it is cut horizontally in thin slices by the same skimming-ladle. Each slice, as it is taken off, is poured along the side of the caldron which is nearest to the operator; by this means every portion of the curd rises successively to the surface, and is sliced thin. The whole is then well stirred, and the caldron is replaced over the fire. A long staff, with a small knob of hard wood at the end, and which has smaller cross pieces or sticks passed through holes in it at right angles to each other near the end, is now used to stir and break the curd, and the heat is raised to about 135°, which is as hot as the arm can well bear, even when used to it. The caldron is again swung off the fire, and the curd is stirred with the staff, which is moved round with a regular rotatory motion, the knob running along the angle formed with the side by the bottom of the caldron, which is in the form of a bowl. After stirring in this manner nearly an hour, the curd is found divided into small dies about the size of a pea, which feel elastic and rather tough under the finger. Experience alone can teach the exact feel they should have. The whey, of which a portion is removed occasionally, now floats at top, and the curd is collected in the bottom by giving a very rapid rotatory motion to the contents of the caldron by means of the staff. A cloth is now introduced into the bottom, and all the curd collected over it; it is raised by the four corners, and laid on an instrument like a small ladder, which is placed across the mouth of the caldron. The whey runs out through the cloth, which is a common cheese-cloth, woven with wide interstices; and the curd in the cloth is placed in a shape or hoop, made of a slip of wood, four inches and a half wide, the two ends of which lie over each other, so that the diameter can be increased or lessened. A cord fixed to one end of the hoop is passed with a loop over hooks on the outer surface of the other end, and prevents the ring from opening more than is required. The curd is pressed into this ring with the hands, and the ends of the cloth are folded over it. A round board, two inches thick, and strengthened by cross pieces nailed on it, is placed over the curd, and the press let down upon it.

The cheese-press is a simple long board or frame, forming a lever, loaded at one end, and moving in a frame at the other; it is lifted up by another lever connected with it, and let down on a strong stick, which stands with its end on the centre of the board last mentioned. Thus the weight is easily removed or replaced. The hoop containing the cheese is placed on a similar board, and from it the table of the press slopes towards a wooden trough, which receives the whey as it runs out. In an hour after this, the curd is examined; the edges, which are pressed over the ring, are pared off, and the parings are put on the centre of the cheese; a fresh cloth is substituted, and the whole cheese is turned. The ring, which opens readily by unhooking the cord, allows the cheese to come out, and is put on again and tightened. This is repeated two or three times in the day. In the evening a small portion of finely powdered salt is rubbed on each side of the cheese, and it remains in the press till the next morning. It is now again rubbed with salt, and placed on a shelf with a loose board under it. The wooden ring remains on the cheese for two or three days, and is then taken off.

During the next six or eight weeks the cheeses are turned and wiped every day, and a small quantity of fine salt is sifted on the surface, and rubbed in with the hand until they will take no more. The cheese-room is always very cool, and little light is admitted. A free circulation of air is essential. The cheeses are in perfection in about six months, and will keep two years. A quantity of elastic fluid is disengaged in the ripening, and forms those round eyes which are a peculiar feature in these cheeses. The smaller and rounder the eyes, the better the cheese is reckoned. They should contain a clear salt liquor, which is called the tears; when these dry up, the cheese loses its flavour.

In Cheshire the making of cheese is carried on in great perfection, and the greatest pains are taken to extract every particle of whey. For this purpose the curd is repeatedly broken and mixed, the cheeses are much pressed, and placed in wooden boxes which have holes bored into them. Through these holes sharp skewers are stuck into the cheese in every direction, so that no particle of whey can remain in the curd. The elastic matter formed also escapes through these channels, and the whole cheese is a solid mass without holes, which in this cheese would be looked upon as a great defect. The salt is intimately mixed with the curd, and not merely rubbed on the outside. This checks internal fermentation, and prevents the formation of elastic matter.

Gloucester and Somersetshire cheeses are similarly made, with this difference, that the curd is not so often broken or the cheese skewered; and a portion of the cream is generally abstracted to make butter. After the curd has been separated from the whey and is broken fine, warm water is poured over it, for the purpose of washing out any remaining whey, or perhaps to dissolve any portion of butter which may have separated before the rennet had coagulated the milk.

Stilton cheese is made by adding the cream of the preceding evening's milk to the morning's milking. The cream should be intimately incorporated with the new milk; great attention should be paid to the temperature of both, as much of the quality of the cheese depends on this part of the process. To make this cheese in perfection, as much depends on the management of the cheese after it is made as on the richness of the milk. Each dairy-woman has some peculiar method which she considers the best; and it is certain that there is the greatest difference between cheeses made in contiguous dairies. The rennet should be very pure and sweet. When the milk is coagulated, the whole curd is taken out, drained on a sieve, and very moderately pressed. It is then put into a shape in the form of a cylinder, eight or nine inches in diameter, the axis of which is longer than the diameter of the base. When it is sufficiently firm, a cloth or tape is wound round it to prevent its breaking, and it is set out on a shelf. It is occasionally powdered with flour, and plunged into hot water. This hardens the outer coat and favours the internal fermentation which ripens it. Stilton cheese is generally preferred when a green mould appears in its texture. To accelerate this, pieces of a mouldy cheese are sometimes inserted into holes made for the purpose by the scoop, called a *taster*, and wine or ale is poured over for the same purpose; but the best cheeses do not require this, and are in perfection when the inside becomes soft like butter, without any appearance of mouldiness. In making very rich cheeses the whey must be allowed to run off slowly, because, if it were forced rapidly, it might carry off a great portion of the fat of the cheese. This happens more or less in every mode of making cheese. To collect this superabundant butter, the whey is set in shallow pans, as is done with milk when butter is made; and an inferior kind of butter called *whey* butter is made from the cream of fat skimmed off.

Cheeses are frequently coloured—a practice which probably arose from the notion of making the cheese look richer; but now it deceives no one. Yet if some cheeses were not coloured they would not be so marketable, owing to the association that subsists between the colour and the quality of the cheese. The substance used for colouring is most commonly anatto. It is ground fine on a stone, and mixed with the milk at the time the rennet is put in. The juice of the orange carrot, and the flower of marigold, are also used for this purpose. Cheddar, a cheese made in Somersetshire, which is highly prized, Stilton, Derby, and some other cheeses, are never coloured: Cheshire slightly; but Gloucester and North Wiltshire deeply. Foreign cheeses are only coloured very slightly, if at all. The Dutch cheeses are made in a very similar manner to the Gloucester cheeses, but the milk is generally curdled by means of muriatic acid or spirits of salt: and great care is taken to prevent fermentation, and to extract the whole of the whey. For this purpose the curd is repeatedly broken and pressed: and before it is made up into the round shape in which it is usually sold, the broken curd is well soaked in a strong solution of common salt in water. This diffuses the salt throughout the whole mass, and effectually checks fermentation. When the cheeses are finally pressed, all the whey which may remain is washed out with the brine; salt is likewise rubbed over the outside, and they are set to dry on shelves in a cool place. The flavour of the cheese is perhaps impaired by the stoppage of the fermentation; but it never heaves, and it acquires the valuable quality of keeping well even in warm climates. From the place where this cheese is commonly made, it is known by the name of Edam cheese. A finer cheese is made at Gouda and other places, by imitating the process in making Gruyère cheese; but this cheese is always full of small cavities, and will not keep so long as the Edam. The cheese most commonly met with in Holland is a large kind of skim-milk cheese, which is made very like Cheshire cheese. It grows hard and dry, and has not much flavour. To supply this defect, cummin seeds are mixed with the curd, which those who are accustomed to it consider a great improvement. On the whole, it is a better cheese than our Suffolk skim-milk cheese, and forms an important part of the provisions usually stored for a Dutch family. In France the Roquefort cheese is compared to our Stilton, but is much inferior, although a good cheese. The little cheeses made from cream and folded in paper, called Neufchâtel cheeses, are imported from France as a delicacy. They can be easily imitated, being nothing more than cream thickened by heat, and pressed in a small mould. They undergo a rapid change, first becoming sour and then mellow, in which state they must be eaten.

The green Swiss cheese, commonly called *Schabzieger*, is produced in the canton of Glarus. The curd is pressed in boxes, with holes to let the whey run out; and when a considerable quantity has been collected and putrefaction begins, it is worked into a paste with a large proportion of a certain dried herb reduced to powder. This herb, called in the country dialect *Zieger kraut* (curd-herb), is the *Melilotus officinalis*, which is very common in most countries, and has a peculiar aromatic flavour in the mountains of Switzerland. The paste thus produced is pressed into moulds of the shape of a common flower-pot, and the putrefaction being stopped by the aromatic herb, it dries into a solid mass, which keeps unchanged for any length of time. When used, it is rasped or scraped, and the powder, mixed with fresh butter, is spread upon bread. It is either much relished or much disliked, like all those substances which have a peculiar taste and smell.

When a cheese which has been much salted and kept very dry is washed several times in soft water, and then laid in a cloth moistened with wine or vinegar, it gradually loses its saltness, and from being hard and dry, becomes soft and mellow, provided it be a rich cheese. This simple method of improving cheese is worth knowing. It is generally practised in Switzerland, where cheeses are kept stored for many years, and if they were not very salt and dry they would soon be the prey of worms and mites. A dry Stilton cheese may thus be much improved.

CHAPTER III.

THE DISEASES OF CATTLE.

In entering upon the subject of the diseases of cattle, our plan will be to render it acceptable to the farmer or grazier who pretends to no anatomical knowledge, but yet is glad of some advice by which to be guided in the treatment of the more ordinary cases of malady which demand his attention. He cannot always have instant recourse to a veterinary surgeon, and in slight disorders may not deem it needful, though we must say we doubt the soundness of such policy. It is by the veterinary surgeon only that all operations must be performed; and in cases of severe accidents his skill must be called into requisition. Nothing is more to be reprobated than the practice, unhappily still too general, of applying to a farrier, ignorant alike of anatomy, physiology, and the symptoms of disease, or to a druggist, who is in the habit of compounding drenches of various nostrums (many worse than useless)—when the lives of cattle are at stake. This practice is the more inexcusable, when professed and well-educated veterinary practitioners are within the call of the farmer,—and of such few towns or rural districts are now destitute. It is not, however, for the veterinary surgeon that we now write; it is, as we have said, for the farmer, and that by way of guide and advice.

The ox, like the human subject, is liable to numerous maladies, arising from different causes: to fever, to inflammatory affections of the brain, lungs, liver, intestines, and other organs; to paralysis, and other diseases connected immediately with the nervous system; to various chronic diseases, and to sudden derangement of the complicated digestive apparatus from improper food. To these classes of diseases other might be added,—setting aside injuries from external causes, which are constantly happening.

Before entering into these more fully, a few preliminaries relative to the constitutional temperament of the domestic ox may not be out of place; it is indeed a point that demands our notice.

Comparing the ox with the horse, neither the nervous nor the arterial system of the former exhibits the same energy as that of the latter. The brain of the ox is small; the nervous energies are soon exhausted, nor are they so easily recruited by rest, as in the horse: the ox will not endure severe labour, especially if hurried, and will frequently sink down with exhaustion; in illness it is sooner prostrated than the horse, and more subject to paralytic weakness. The chest, moreover, has less volume, and the free play of the lungs is more frequently oppressed by the distension of the stomach, which, with the abdominal viscera, occupy more room in proportion, as being of comparatively predominant importance. The ox, indeed, is expressly formed for giving milk and flesh as the food of man; and though this animal has been employed in labour from the earliest times, it was for slow labour, with frequent intervals of rest.

The pulse of the ox is quicker than that of the horse, ranging from fifty to sixty, in a state of health; in the horse it is under forty. In cattle, near the time of calving, the pulse often rises to eighty or eighty-five, and in milch cows is always quicker than in oxen. The arteries generally, those arising from the heart immediately being excepted, are comparatively much smaller than in the horse; while, on the contrary, the veins are far larger, and indeed the whole venous system is more developed, and especially so in good milch cows, in which the subcutaneous abdominal vein (or milk vein) is taken as a criterion of their qualities.

It is not always an easy thing to feel the arterial pulse in cattle: this may, however, be generally effected at one of the following arteries:—The *submaxillary*, a branch of the carotid which dips under the angle of the lower jaw; the *temporal artery* running up between the eye and the ear; or the *anterior auricular artery*, which supplies the anterior muscles of the ear. The pulsation of the heart itself may be tried by placing the hand on the left side of the chest, a little within and behind the elbow. The warmth or unnatural coldness of the ears, and the heat of the blood at the roots of horns, are points to be attended to in conjunction with the pulse.

When blood is abstracted from cattle, the external jugular vein is that commonly selected for the lancet; it is very apparent, running along the side of the throat from the angle of the lower jaw. A skilful operator will use a strong broad-shouldered lancet, but the farmer contents himself with the fleam, which in his hands is more certain and safe; but, whether the lancet or the fleam be employed, the neck should not be strapped or corded round, as the pressure, being alike on both sides of the neck, impedes the return of the blood from the head; firm pressure of the fingers a little below the spot where the puncture of the vein is to be made, will suffice to render it prominent. Occasionally, in affections of the mouth or nasal organs, a flow of blood is obtained from the vessels of the palate by free incisions on the latter; and sometimes certain veins of the limbs (the cephalic of the fore limb, the saphena of the hind limb) are selected. In inflammatory diseases prompt and efficient bleeding is indispensable; and this should be carried so far at once as to affect the circulation, and thereby, if possible, arrest the course of the disease. Timid bleeding, rendering its repetition needful, is to be eschewed; but at the same time attention should be paid to the age, constitution, and vigour of the animal. In an aged cow, which has had numerous calves, less loss of blood will suffice than in a young one, whose constitution is unimpaired, or an ox in full vigour. From the latter, two gallons of blood may be extracted, while from the first, half the quantity will probably suffice. To bleeding, aperient medicine should be added; and in this we can scarcely ever do wrong, for cattle bear aperients, especially with a little carminative, to excite the action of the stomachs, better than the horse, in whom they sometimes produce dangerous irritation of the alimentary canal.

It is to the inflammatory diseases of cattle, which demand prompt measures, carried out with boldness yet discretion, that we shall first direct our attention.

SIMPLE FEVER.

Cattle, especally in swampy lands, are subject to attacks of fever; this is sometimes pure or idiopathic, and occasionally assumes an intermittent form; but if suffered to proceed, some vital organ, predisposed to inflammation, becomes as it were the centre of irritation, and the case may terminate fatally.

In simple fever the animal is languid and dull, it refuses food, the hide loses its mellowness, the flanks heave, the horn is hot at its base, and the pulse is hard and quick. In a day or two the animal seems better, but after a brief interval the symptoms return with increased violence, the breathing becomes more laborious, rumination ceases, though the animal often lies down—but this is from weakness—and the mouth is dry and hot. Mischief is now coming on, and, most probably, in the form of inflammation of the lungs.

This disease is, perhaps, the most prevalent in autumn, when cattle are exposed in damp lands, and heavy cold fogs set in at night, or partial frost which crisps the grass yet luxuriant though harsh. It may arise from miasmatous exhalations, or from water putrescent with decomposed leaves or other vegetable matters. At the beginning of the disease, the judicious farmer will remove the animal, and take away some blood, giving afterwards a cathartic dose, composed of from eight to twelve ounces of Epsom salts (sulphate of magnesia), two or three ounces of sulphur, two drachms of powdered ginger, the whole mixed in a quart of warm water; half a pint of linseed oil may be added. The diet must be reduced and mashes given, with repetitions of the cordial purgative, till the animal regains its wonted cheerfulness, and every symptom has disappeared.

It not unfrequently happens that fever, appearing at first in a slight and simple form, suddenly puts on a decidedly *inflammatory* character; or, on the contrary, assumes a low *typhoid* form, in which, as in the human subject, the vital energies give way under the process of what is not unaptly termed a secretly consuming fire.

INFLAMMATORY FEVER.

This disease, called black quarter, quarter-ill, evil-joint, blood-sticking, and other meaningless names, is often prevalent in certain districts, and during certain years occasions extensive mortality. Young cattle are the most commonly seized, their habit being more disposed to plethora than aged subjects. Sometimes the disease appears to be epidemic, or at least attacks whole herds turned imprudently from spare diet upon luxuriant pastures, subjected to wet cold nights while the blood-vessels are receiving an inordinate addition of the vital fluid from the assimilating system.

So rapidly does this fever come on, that the slight precursory febrile symptoms are often unnoticed; and so quick is its course that there is little time, or none, to have recourse to remedies. Generally, however, the ordinary symptoms of simple fever may be noticed; but these all at once assume a most aggravated form; the animal labours under a general venous congestion, and dies a mass of putridity.

The first stage of this disease is highly inflammatory. The pulse is quick, hard, and strong, the eyes are inflamed and protruding; the tongue is dry and parched; the breathing laboured and quick, with deeper inspirations at intervals; the head is stretched forth, the neck at full extent, and an agitated expression marks the countenance; the appetite is gone, and of course rumination suspended. This is the first, or perhaps, in reality, the second stage; at all events it is the first noticed, and these symptoms are apparent, though in particular cases some may be more marked than others. What is now to be done? First, bleed, aiming at once for all, and bleed freely, even to fainting; then give active aperients, and if necessary bleed again, but now with caution, and not within six or eight hours after the first operation, for the strength of the animal, and the state of its exhaustion, are points to be kept in mind; but recourse must be had to a second and copious bleeding unless a decided improvement has already manifested itself. Sedatives should succeed the brisk aperients: half a drachm or a drachm of digitalis (foxglove leaves properly dried and powdered), one drachm of tartarized antimony, and four drachms of nitre, mixed in any demulcent liquid, may be given twice a day. A seton of black hellebore should be inserted into the dewlap. Should the disease continue, the animal utters low distressing moans, and is generally unconscious of surrounding objects; it will stand gasping, but without change of posture, for a considerable time; and when it attempts to move it staggers and reels, and the hind quarters seem affected with a partial paralysis; the loins are so tender that the slightest pressure produces pain; and swellings arise on the shoulders, back, and limbs, which, when pressed, make a crackling noise. These swellings arise from an effusion of some gas into the cellular tissue, the consequence of a putrescent state of the blood. Debility now rapidly increases, and the animal drops; perhaps it rises again, but it again falls prostrate, and after making vain attempts to recover its limbs, sinks into a comatose state, and dies. Sloughing ulcers, in this stage, often spread over the abdomen, the limbs, and other parts; the mouth, muzzle, and tongue are ulcerated: a sanious offensive fluid drops from the mouth and nose; and the alvine excretions are extremely fetid, and mixed or streaked with blood. In this state the poor beast may continue two or even three days, till relieved by death. Farmers call these ulcerations and their concomitants, *black quarter*; and the paralytic state of the limbs, *quarter-evil*, or *joint-murrain*.

If the disease be not checked in its inflammatory stage, the chance of saving the animal, when congestion of every organ, brain, lungs, heart, liver, intestines, &c., from the violent excess of arterial action, has commenced, is very precarious. The first object will be to relieve the congestion under which the vital powers of the system succumb; if previous bleeding has been neglected, there is no room for hesitation, for, weak as the animal may appear, the system must be relieved; but if the animal has been freely bled and purged, the question will arise, how far will it be prudent to extract more blood? As a general rule, blood should be taken, and the state of the pulse should be watched: if it become softer there is still hope; but if it fail, and become more and more indistinct, the flow of blood should be stopped. Active aperients should be administered, beginning with a pound dose of Epsom salts, succeeded by half-pound doses at intervals, until the bowels are acted upon. Nor should injections be neglected in aid of the medicine. These may consist of half a pound of common salt and a little oil, in four quarts of water or thin gruel. The swellings of the limbs and loins should be fomented with hot water, and the fetid sloughing ulcers washed repeatedly during the day with a solution of chloride of lime (half-an-ounce of the chloride in a gallon of water); the muzzle and tongue should be similarly treated. Some practitioners recommend that a pint of this solution be gently horned down into the stomach, perhaps more than once; for if there be hoove, or distension of that organ by gas, this solution will combine with it, prevent its further formation, and correct the fœtor, which is often almost unbearable.

After these remedies, and supposing the bowels to have been well cleared, mashes of thick gruel should be offered, or even gently poured down the gullet.

If the ulcers cleanse, the swellings disappear, and the animal begins to eat,—indications of incipient recovery,—tonics may be given, but not previously. One or two drachms of gentian (pulv. gentianæ), and half a drachm of ginger, mixed with gruel and half a pint of good ale, may be given twice or thrice a day. The curative process of the ulcers will be promoted by dressings of tincture of aloes. The seton, however, should be continued for two or three weeks.

It is easier to prevent the attack of this formidable disease than to cure it. Cattle, and young cattle especially, should not be suddenly put into rich pastures; they should be previously purged, and introduced by degrees, being occasionally removed into a bare pasture, where, without gorging to repletion, they may digest at leisure what they have taken. Too much water is dangerous, especially if taken when the animal is from any cause overheated. Putrescent ponds, turf-pits, and the like, are to be avoided, as the water is noxious even if taken in moderation. Young growing cattle should not be too highly fed. There is no occasion to starve them, but there is a medium which good sense will dictate. The stock, moreover, should be daily inspected; and should any suspicious symptoms appear,—any shivering, any heaving of the flanks, any difficulty of respiration, any dulness or redness of the eyes,—a purgative, and the loss of a little blood, may stop the approaching mischief.

TYPHUS FEVER.

Inflammatory fever in cattle of all ages, but more particularly in adult beasts, sometimes assumes a low, lingering, typhoid form. The gait is staggering, the appetite is gone; diarrhœa succeeds moderate doses of medicine, or comes on spontaneously. Tumours appear on the limbs, back, udder, &c., and ulcerate, and the breath is fetid. This disease is most prevalent in the spring and autumn; especially on marshy lands, subject to miasmatous exhalations. It is sometimes epidemic and fatal to a great extent, sweeping away numbers of valuable cattle. Occasionally it is accompanied by a catarrh, but mostly by diarrhœa or dysentery, the indication of inflammation or congestion of the mucous membrane of the intestines. The same decided treatment which we have described in inflammatory fever must be adopted: the lancet must be used boldly. The purgative of salts, &c., should be given, and its action kept up by six or eight ounce doses of sulphur. If the dysentery be violent, calomel and opium will be found useful, in doses of thirty or forty grains of the former and a drachm of the latter, mixed in thick gruel: emollient injections should be administered, and castor oil given in doses of a pint. The irritation of the intestines must be allayed, and their healthy and vigorous action induced. A seton of hellebore should be inserted in the dewlap; and the general treatment be conducted as we have detailed in inflammatory fever.

CATARRH, OR HOOSE; EPIDEMIC CATARRH, OR INFLUENZA; AND MALIGNANT CATARRH, OR MURRAIN.

Catarrh, or hoose, consists in inflammation of the lining membrane of the great nasal cavities, spreading to the fauces, the glands of the throat, and the larynx and windpipe. It is mostly, perhaps, in the spring and autumn that catarrh prevails; it is caused by sudden changes of temperature; as, for example, a change from a close, overheated, and crowded cowhouse to a bleak unsheltered pasture, during cold rain or stormy easterly wind. Cattle heated by being overdriven, and exposed to a cold current of air, are apt to be affected by it.

This disease commences by febrile symptoms: the pulse is quick and hard; the roots of the horns are hot; the ears and head are drooping; the animal is dull, repeatedly coughs, and neglects to feed. In a short time a discharge from the nostrils takes place; the animal swallows with difficulty, and exhibits great debility. If neglected, the disease insidiously pursues its course, atrophy ensues, the lungs become affected, and consumption supervenes. However slight catarrh may appear at first, it should not be, as it too often is, regarded with indifference. The cow has a discharge from the nose, her milk decreases, she coughs, her flanks heave, she loses flesh; and perhaps, when it is too late, the farmer takes the alarm, and sends for the veterinarian.

The treatment of this disease, if taken in time, is simple. Blood must be abstracted (the animal having been placed under shelter and apart), and this must be followed by saline aperients, salts and ginger, in whey or gruel; after which doses of nitre (nitrate of potass) may be given two or three times a day in gruel. The dose may be from two to four drachms. Nitre will allay inflammation, and act upon the kidneys. Gruel, warm bran mashes, with a little grass or good hay, constitute the best diet. If the difficulty in swallowing is considerable, a seton in the dewlap should not be omitted; or the throat may be blistered (though not readily) by rubbing the skin with the common blister ointment, or a liniment consisting of an ounce of the powdered blisterfly, two ounces of oil of turpentine, and six ounces of common oil.

Catarrh is sometimes epidemic, spreading over whole districts, and assuming a very virulent and dangerous form. At the commencement the fever is very severe, the respiratory passages are greatly inflamed, there is a distressing hoose, and the aspect is agitated. Sometimes the bowels are confined; but sometimes diarrhœa comes on, and is very troublesome. If not checked, a stage of debility supervenes, the fever assumes a typhoid form, crackling air-filled tumours in the cellular tissue show themselves about the head, loins, and limbs; the breath becomes fetid, the animal staggers, its coat is staring, its flesh wastes away, the discharge from the nostrils is sanious, and death ends the scene.

During the febrile stage, bleeding freely and promptly, with a repetition of the bleeding if necessary, together with active aperients and sedatives (digitalis, tartarized antimony, and nitre), as recommended in inflammatory fever, warm mashes, and injections, must be resorted to. But in the stage of debility little can be done. Doses of nitrous ether (two or three drachms) and laudanum (half-an-ounce), mixed in gruel, may perhaps be serviceable. Should the fever pass off, and simple weakness only remain, tonics, such as gentian and ginger may be given.

Catarrh sometimes appears in the form of a malignant epidemic, sweeping away the cattle of whole districts, and, in fact, spreading over whole countries.

INFLAMMATION OF THE LARYNX AND WINDPIPE.

Besides the catarrhal affections described, cattle are subject to inflammation of the lining membrane of the larynx and windpipe, often extending through the bronchial tubes. This is a formidable disease, sometimes apparently epidemic, but more frequently the result of sudden atmospheric changes in cold damp situations. The disease commences with the usual symptoms of fever, shivering, loss of appetite, a quickened pulse, and a laboured, husky, wheezing respiration, to which succeeds great debility. The least pressure along the throat evidently gives great pain, the animal moves its head stiffly and with difficulty, and cannot swallow, without a marked effort, the drinks administered.

On examination after death, the lining membrane of the larynx and bronchiæ show the result of violent inflammation in ulcerated patches and gangrene, the gullet being also more or less involved in the disease. The windpipe is generally filled with purulent matter; and if the disease has extended to the bronchial tubes, the same appearances are there also presented; but these tubes are often choked up with parasitic worms of the genus *filaria*, and they appear also in the windpipe. In bronchitis of the horse, a species of the worm *strongylus equinus* in like manner is found to throng the bronchial tubes. It is not easy to account for the presence of these worms, unless we suppose their minute eggs to be taken in with the air or food, and pass through the lacteals into the blood, which carries them through the circulation, till at length they find a nidus appropriate for their development; but there is still this difficulty,—Whence came the eggs into the air or among the food? The worms, as it would appear, are exclusively the inmates of living creatures: how do they spread—how do they extend their colonies? This is not the place for speculation. In laryngitis, that is, inflammation of the larynx not extending down the windpipe, recourse must be had very promptly to bleeding, smart aperients, blisters, and a seton of hellebore. If the disease runs on, suffocation ensues; but, should this catastrophe threaten, tracheotomy must be performed: that is, the trachea must be opened, and respiration carried on through a tube or canula. No one but an experienced veterinary surgeon can perform the operation, or should attempt it. If the disease extend to the trachea or windpipe, the same treatment is necessary.

In bronchitis, or inflammation of the branches of the windpipe which ramify through the lungs, the symptoms are a cough, which becomes more and more husky and wheezing; a rapid and laborious breathing; the flanks heaving; the belly tucked up; the hide staring; the skin hide-bound; an anxious, restless expression; a disinclination to move; an increase of the painful cough, and a hurriedness of respiration, on taking a few steps. The animal wastes away, and dies a skeleton, often by suffocation; the air-tubes being blocked up by the thickening of the lining membrane, by mucus, and by worms.

To this disease young cattle are peculiarly subject; and we need not say that it is one of a most destructive nature. The great object at the commencement of the attack is to subdue the inflammation by bleeding, active aperients, and sedatives; if these means prove unsuccessful there is little hope. When the tubes are thickened, clogged with mucus and worms, what can be done? Could the irritating parasites be removed there would be a chance of recovery. Spirit of turpentine promises at least occasional success. In calves labouring under hoose and the irritation of bronchial worms, spirit of turpentine has been found efficacious, and might be in older cattle. Mr. Dickens recommends in cases of hoose or cough in calves, the bronchial tubes of which are filled with minute worms, the following draught, repeated at intervals of a week or ten days:—

Linseed oil, 1 oz.
Oil of turpentine, 4 oz.
Oil of caraways, 20 drops.
Mix.

A contributor to the *Veterinary Journal* has found the following mixture very successful, viz:—

Spirit of turpentine, 6 oz.
Tincture of opium, 1 oz.
Balsam of sulphur, 1 oz.
Gentian, } of each 1 drachm.
Ginger, }

The dose of spirit of turpentine for grown-up cattle may extend from two to four ounces, with as much linseed oil, a few drops of caraway, and a little gruel.

The *rationale* is as follows: the turpentine, so peculiarly destructive to worms, is taken up into the system, enters into every part of the circulation, and is recognizable both in the urine and breath. It is thus brought into contact with the worms, which it immediately destroys; their hold being loosened, they are then easily expelled from the larynx by the cough, and the bad symptoms will gradually abate. The dose may be repeated every other day, or twice in the week.

INFLAMMATION OF THE LUNGS, OR PNEUMONIA.

With the bronchial disease, previously described, there is generally an attendant inflammation or congestion of the lungs (that is, of their cellular substance) to a greater or less extent; but sometimes pneumonia manifests itself independently and in an acute form. It is generally the result of over-driving cattle when in an unfit state from fat to travel hard or work long. The disease commonly makes its appearance within a day or two from the exciting cause of it, and is characterized by dulness, a frequent cough, a drooping of the head, and a heaving of the flanks, to which the animal often turns its head; the horns, ears, and legs are cold, the pulse is small and quick, but sometimes not quicker than usual. Respiration is evidently painful; this, the frequent act of turning the head to the sides expressively indicates; but the cough is not so frequent as in bronchitis. Frequently the animal grinds the teeth, and utters short groans. The cattle generally stand sometimes lie down, and this is always the case with calves. The smallness of the pulse, arising from congestion of the cellular tissue of the lungs, should not deter us from bleeding, nor from cautiously repeating the abstraction of blood if necessary. In the horse, when labouring under inflammation of the lungs, aperient medicines are dangerous; but in horned cattle this is not the case, and brisk medicines may be administered with advantage, assisted by injections. The sides should be blistered or fired by the cautery, and setons of hellebore inserted into the dewlap. Bran mashes and gruel may be given, and the animal on recovering must be kept low, and only allowed by degrees to return to its ordinary diet. Acute pneumonia sometimes appears as an epidemic, and rapidly passes through its stages, mostly ending fatally. In this disease the symptoms of ordinary pneumonia are all aggravated. The muzzle is dry, the mouth is hot, the flanks heave, there is excessive thirst, the coat is rough, the hind limbs are feeble, and the alvine excretions are either hard and black, or liquid, dark, and fetid; soon the spine exhibits signs of tenderness, especially over the lumbar region; there is harsh grinding of the teeth, moaning, violent heaving of the flanks, and a convulsive cough; the eyes are wild, the expression is agitated, the nostrils open and close as if with a spasmodic effort; sometimes tumours appear on the skin, and occasional shivering is succeeded by violent sweating; alternately the back becomes arched, the belly contracted, the pupils of the eyes dilate, stupor comes on, and the beast falls and dies. After death the lungs are found on examination to be gorged with black blood, often offensive and putrescent; in some parts they appear hepatized or solidified like liver; sometimes tubercles filled with purulent matter are present; the pleura, or investing membrane of the lungs, is thickened; and the heart and diaphragm exhibit the ravages of inflammatory action. Generally the fourth stomach is inflamed, and the maniplus filled with hardened material. From the horribly putrescent state of the gorged blood in the lungs this disease has been called gangrenous inflammation of those organs, but the term is incorrect. This disease, at various times, has appeared in different parts of the continent, in Germany, France, Denmark, &c.; in England it is also known, and is often the cause of great mortality. It is only at the commencement of this fearful malady that there is much chance of doing good. A free use of the lancet is imperative; bleeding must be pushed to its utmost extent, and smart aperients with injections must succeed; these having acted, sedatives, as nitre, digitalis and emetic tartar combined, may be given at regular intervals. Some veterinary surgeons recommend as a purgative two scruples of the powder of croton seeds, to be followed up by salts and the injection pump. (No farmer should be without the enema-pump of Read's invention, or at least a simple apparatus, always at hand). Setons in the dewlap, and firing the sides, or blisters, should not be omitted. Should the inflammatory symptoms yield, care and a cautious diet will be all that is ordinarily needed, unless the debility be such as to render tonic draughts advisable.

The following observations by Mr. Lord, in the *Veterinarian*, for July, 1841, are very interesting: "In the latter end of last April," he writes, "the Earl of Kingston sent for me, and told me that his cows were dying very fast from some disease that had been in his farms for the last year, and which his steward believed to be incurable. After a minute examination I found the symptoms as follows:—pulse in almost all that were affected from 93 to 120, but very small; horns, ears, and legs cold; the animals heaving violently at the flank, and grunting as if in great pain, also grinding the teeth. With the stethoscope I could discern the bronchial respiration in some, and the mucous *râle* in others.

"*Treatment*.—In the early stage I bled largely, notwithstanding that the pulse was small, as I consider this arises from pulmonary congestion, which bleeding removes. I next fired and blistered the sides, and gave *white hellebore* half-a-drachm, morning and night, as long as they could bear it, and changing it then for tartarized antimony and nitre, keeping the bowels open by occasional laxatives. With this treatment I cured four out of five of the beasts which the steward and attendants considered as sure to die, and I have more recovering."

PLEURITIS, OR INFLAMMATION OF THE INVESTING MEMBRANE OF THE LUNGS AND THE LINING MEMBRANE OF THE CAVITY OF THE CHEST.

Although in acute pneumonia the pleura covering the cellular mass of the lungs is generally involved in the inflammation, yet inflammation confined to the pleura itself is not of uncommon occurrence. Many causes conduce to this affection: exposure to keen draughts of wind, a wet couch, over-exertion, blows on the side, lying all night on the frozen ground unsheltered from the weather,—these and the like may induce the disease.

In pleuritis the shivering fits come on with great frequency and violence, during which the shoulders quiver; and this latter symptom occurs even when there is no general shivering. The breathing is quick, short, and abrupt, like rapid panting; there is a short but painful cough, there are twitchings and a wavy motion of the skin of the sides, and the animal shrinks as if from pain when the latter are pressed. The flanks are tucked up, and the expression of the countenance is distressed; if the disease go on, it usually terminates in the effusion of serum, not unmixed with coagulated lymph in the chest (in fact a dropsy of the chest), which oppresses the lungs, prevents their action, and destroys life. In pneumonia we observed that the lungs were gorged with black putrescent blood; in this disease they are smothered in water, which fills the cavity inclosing them. The treatment of pleuritis is, however, the same as pneumonia. The lancet is the sheet-anchor of hope, assisted by aperients, blisters, setons, and low diet.

Occasionally pleuritis changes its acute for a chronic form, and the animal lingers on, becoming emaciated and weak, with a dry cough, tenderness of the sides and loins, and difficulty of respiration, as in asthma, accompanied by a short groan and a drawing down of the angles of the lips, with a heaving of the sides. The animal at length dies, wasted away to a mere skeleton. On examination, the lungs are found more or less extensively adherent to the sides of the chest, bound by firm bands, the result of inflammation; there is generally fluid also in the chest and in the pericardium. Where the pleura of the chest and lungs do not adhere, the membrane is thickened and has its texture changed. In these cases there is no hope of cure. An animal, indeed, may live and enjoy life, when, after acute pleuritis, adhesions exist between the lungs and chest; but then all inflammatory action is subdued. On the contrary, in these cases it goes on like a smouldering fire, sometimes apparently extinguished, but again returning; new adhesions succeeding to those previously formed, till the lungs can no longer perform their functions.

In animals which have died from pleuritis, we have often observed the pleura of the chest appear as if very minutely granulated. We remember once, in the human subject, seeing the pleura studded with calcareous patches of some thickness; and a similar deposit sometimes occurs in cattle.

CONSUMPTION, OR PHTHISIS.

Neglected catarrh, or inflammation of the lungs, often produces tubercles in the lungs, which, increasing in size and running together, at length suppurate, forming abscesses in the substance of those organs. The progress of consumption is insidious: in the human being life continues even when a great portion of some of the lobes of the lungs is wasted away by ulceration. The hollow, distressing cough, the hectic flush, the overbright eye, the expectoration of purulent matter, often mixed with blood, foretel the result; but if a sufficient quantity of the lungs is left for respiration, unless some larger blood-vessel or tubercle burst and produce sudden suffocation, the patient lingers on.

In the ox the same thing occurs. We have seen extensive tubercles in the lungs of oxen killed in good condition for the market; and the fact has often surprised us—but on considering that the progress of the tubercles is at first slow, that they do not for a long time interfere with the functional duties of the lungs, that the animal reposes at ease in a stall or yard, fattening, notwithstanding the tuberculous affection of the lungs (so that, most probably, the rapid increase of the disease resulted from the long journey to London, during which respiration was necessarily hurried, and a larger quantity of blood sent through the lungs), while time was not allowed, before the butcher's stroke, for the wasting of the body — on considering these points our surprise diminished.

We have said that neglected catarrh, or inflammation of the lungs, often produces phthisis; and such is the fact: but we suspect that there must be in such cases a predisposition to this scrofulous affection. Often, indeed, phthisis manifests itself without any previous definite symptoms. Minute tubercles have existed dormant in the lungs, perhaps for years, nay, perhaps even from birth; but some exciting cause not to be clearly appreciated or detected,—a trifling cold, a hurried walk, a sudden chill after perspiration, damp garments, or some trifling neglect, is followed by dull pain in the chest, a hollow peculiar cough, uneasiness in lying on one side or the other, and other symptoms, which go on for months, or years, till some additional cause accelerates the progress of the disorganization, when copious purulent expectorations, hectic night sweats, debility, severe diarrhœa, and emaciation, end in death. If these observations apply directly to our fellow-creatures, so they do to the dumb brute. During the progress of consumption in the human subject, the appetite is often undiminished, though digestion is slow and difficult; and the mind is not only clear, but roused to intense activity. In the ox, the appetite seldom fails much—the animal is lively; nay, in cows the sexual desires seem not only unabated but increased, but the animal is subject to abortion. During pregnancy the symptoms of consumption are generally much mitigated; the great current of blood is directed elsewhere for an especial object; but, after delivery, the disease goes on with accelerated rapidity. In cattle, besides the hollow cough, there are purulent and sometimes bloody discharges from the mouth and nostrils, and irrepressible diarrhœa; the skin is evidently very painful when pressed; the cellular tissue beneath is either inflamed or becoming disorganized; the surface of the skin is dry and scaly, and some writers affirm that it will even creak as the animal moves feebly along.

When phthisis is fairly confirmed, medical treatment is of no avail; but, in the incipient stage, blisters, sedatives, and cautious bleeding, with a seton on the side, or in the dewlap, may arrest for some time its further progress. The animal, moreover, should be housed in a comfortable and well-ventilated stable, apart from other cattle, and not exposed to the north or easterly winds; it should never be hurried or alarmed; the litter should be always kept dry, and the skin often currycombed, in order to excite the action of the cutaneous vessels.

With respect to the use of iodine in incipient phthisis, some practitioners speak very highly. Mr. Youatt says, that though he will not affirm that he has discovered a specific for consumption in cattle, yet he has saved some that would otherwise have perished. He would urge on practitioners the study of the symptoms of phthisis, and attention to the inward, feeble, painful, hoarse, gurgling cough, of consumption; and as soon as they are assured that this termination of catarrh, or pneumonia, or pleurisy, begins—that tubercles have formed, and have, perhaps, begun to suppurate—let them have recourse to the iodine in the form of the iodide of potass, given in a small mash in doses of three grains, morning and evening, at the commencement of the disorder, and gradually increased to six or eight grains. To this should be added proper attention to comfort, yet not too much nursing, and free access to succulent, not stimulating food. The medicine should be continued not only until the general condition of the beast begins to improve, but until the character of the cough has been essentially changed.

INFLAMMATION OF THE HEART AND PERICARDIUM.

In the horse, an animal called to violent and continued muscular exertion, to the toils of the chase and the course, inflammation of the heart is by no means of uncommon occurrence; but in the ox it rarely occurs as a disease *per se.* The symptoms cannot be mistaken: the pulse is full and very strong, and the heart may be seen and felt violently pulsating against the left side of the chest; and each stroke may be heard, even at a distance.

Copious bleeding through a large orifice, even to fainting, and repeated if the symptoms are not decidedly suppressed, with smart aperients, are the only means on which any dependence is to be placed.

Inflammation of the pericardium, or sac enveloping the heart, occurs occasionally from extraneous causes. Cattle have sometimes a strange propensity to swallow sharp-pointed substances, as pieces of wire, large needles, nails, &c.; and these articles, which, when accidentally taken into the stomach of other animals, work their way out externally, generally without much injury, take in cattle a more dangerous course.

In cattle such substances often, perhaps mostly, work their way into the pericardium, producing inflammation, and often extensive ulceration or dropsy of the chest. Several cases of this kind are on record, in which pieces of wire, large pins, and needles, have been discovered, after death, sticking in the pericardium. The symptoms in these cases are obscure, till effusion in the chest is detected by the ear or the use of the stethoscope. We need not say that no directions for medical treatment in such cases can be given.

INFLAMMATION OF THE LIVER, OR HEPATITIS.

Acute inflammation of the liver does not appear to be a very common disease in cattle; and occurs mostly in such as are stall-fed on high diet, and debarred from due exercise. The symptoms of this disease are not always very determinate. There is generally a yellowness of the eyes and skin, indicative of a cessation of action in the liver, which no longer separates the bile from the blood. Considerable fever exists, indicated by dryness of the muzzle, heat of the mouth, and a quickened pulse; the abdomen, especially on the right side, is tumid, and pressure gives decided pain; the animal often turns its head round, and endeavours to lean the muzzle against it. The bowels are generally constipated; but this condition often alternates with violent purging. Mr. Brown, in the *Veterinarian,* remarks, that a diminution in the milk of the milch cow is one of the first symptoms, and that the cream drawn from it presents a ropy appearance, and has a saltish taste. As the disease progresses the aspect of the animal becomes dull and depressed, and the appetite impaired; the animal loses its ordinary activity, its gait is stiffened or staggering, with a halt on one or more of the limbs. The eyes are dull, and the transparent cornea sometimes becomes opaque; the nose is alternately dry and moist; the mucous membranes, the nasal secretions, and the skin, are yellow.

In protracted cases, when the animal begins to recover, "a yellow scurf rises from the skin, which gives the hair the appearance of being dusted with turmeric." Rumination is either wholly or partially suspended, the secretion of milk is limited, and inflammation usually appears in one or more quarters of the udder. Tumours not unfrequently appear in different parts of the body, and, on bursting, discharge a fetid matter.

In some cases the respiration is at first frequent, and accompanied with a short painful cough; but in most instances it is not much disturbed. The bowels are generally obstinately constipated, with occasional intermissions of diarrhœa; but some cases occur in which the animal is attacked by violent purging, the alvine excretions being copious, dark, and fetid. During the progress of the disease the pulse varies considerably in its character, but is usually feeble.

The treatment recommended is moderate bleeding in the early stages of the disease, which it may be often necessary to repeat; after this one drachm of calomel, suspended in thick gruel, with half a drachm of opium, and two drachms of ginger, may be given. In the course of six or eight hours after this, an aperient, composed of eight ounces of Epsom salts, four ounces of sulphur, and half-a-pint of linseed oil, with gruel, may be administered, and repeated in twelve or eighteen hours if the prior dose has taken no effect. "In severe cases a blister may be applied to the right side, and a drachm of calomel, half-a-drachm of opium, two drachms of gentian, one of ginger, and two of nitre, administered in gruel twice a day."

In cases where diarrhœa occurs from the commencement, the aperient dose should be either entirely omitted or given in only half the quantity, but the calomel and opium, &c., repeated morning and evening. In all cases the diet should be restricted and simple, and as little stimulating as possible.

Active inflammation of the liver may yield to a certain extent, and ultimately merge into a chronic form; the liver now becomes preternaturally enlarged and indurated, sometimes soft and spongy; it is often studded with tubercles of large size filled with purulent matter. It is the nidus of numerous hydatids; and fluke-worms (*distoma hepaticum*) inhabit cysts in its substance and even the biliary ducts.

Chronic inflammation, however, is not necessarily the result of active inflammation; it occurs when no such inflammation has previously existed, and it may continue for a considerable period without any decided symptoms being manifest. We have frequently seen decided indications of chronic disease of the liver in animals slaughtered for sale, and which were in good condition. This disease may run on to a horrible extent before it destroys life, though the animal may be meagre, weak, dull, and hide-bound.

JAUNDICE, OR YELLOWS.

Jaundice, to a greater or less extent, is the accompaniment of chronic inflammation of the liver; it arises from the obstruction to the passage of the bile through the ducts, either from alteration of the intimate structure of the liver, or from the pressure of tubercles or tumours.

There is, however, another and very common cause of jaundice, which, in noticing the morbid affections of the liver, we cannot here omit to describe; we allude to the obstruction of the biliary ducts by gall-stones. It is astonishing how often gall-stones are found in the gall-bladders of cattle: they vary in size from a pin's head to a walnut, and as long as they cause no obstruction, they neither inconvenience the animals nor interfere with health. But sometimes, nay very often, they enter the duct which conveys the bile to the intestines (the cystic duct) from the gall-bladder, which unites with a larger common duct from the liver itself, before entering the duodenum. When a gall-stone enters the cystic duct, it soon becomes impacted; it stops the current of the bile; spasmodic action of the muscular fibres of the duct, occasioned by the irritation, and accompanied by violent agony, succeeds; the skin and eyes become suffused with bile; generally in due time (longer or shorter, according to the size of the stone or calculus) the duct is dilated, and the obstructing object passes into the larger common duct, along which, not, however, without causing some obstruction, it proceeds till it comes to its entrance into the intestine (duodenum). Here again it meets with a fresh difficulty; this entrance is surrounded by muscular fibres, which act as a sort of valve, or rather as a constriction, yielding freely to the pure bile, but contracting on the irritation of a preternatural object. Before this barrier is forced, spasmodic agony again takes place; at length the muscular fibres yield, and the gall-stone passes into the intestine; the pain ceases, but it is some time before the jaundice of the skin disappears. Unfortunately, when this occurrence has once taken place, it opens the way for repetitions of the whole affair, and calculi sometimes lodge in the ducts for a considerable time, producing confirmed jaundice. This state of things cannot exist without producing general derangement of the system; the alimentary canal is immediately affected; loss of appetite, constipation, thirst, a hard quick pulse, a heaving of the flanks from increased and febrile respiration, dulness, and loss of strength and flesh, with yellowness of the skin, of the eyes, and of every secretion, milk, urine, &c., are prominent symptoms. The skin becomes dry, and throws off yellow mangy scurf, and the hair becomes ragged, and falls off in unsightly patches; then, perhaps, an uncontrollable diarrhœa comes on, under which the poor beast may sink. It can scarcely be possible, with this state of affairs, that the liver will not become more or less inflamed; and thus may gall-stones produce a disease in that organ which did not previously exist. Hence, then, while a jaundiced state of the skin may result from chronic inflammation of the liver, the obstruction of gall-stones in the biliary ducts may not only produce the same yellow suffusion, but even excite inflammation, which perpetuates the jaundice.

It is the opinion of some writers, that the presence of fluke-worms (*distoma hepaticum*) in the biliary ducts will produce jaundice. We will not say that these parasites may not occasionally produce it, but we can say that of numbers, not a few, of ruminants of every species, which it has been our lot to examine after death, not one was jaundiced when fluke-worms alone were found in the liver or biliary ducts; the same observation applies to hydatids in the substance of the liver. Indeed, we have found fluke-worms in the liver of some of the best-fed and most healthy-looking sheep that were ever slaughtered by the butcher. It is a fact that the liver of the finest codfish is infested by hundreds of cœlelminthous worms, coiled up in cells or crypts, and which move and crawl for a long time after being extricated from their nidus.

With respect to the treatment of jaundice:—Could we, as in the case of the human patient, be informed as to the character and seat of the agony the animal is undergoing during the passage of gall-stones, we should have recourse to opium, sedatives, hot fomentations, and subsequent aperients; but, as a general rule, the poor animal endures its pain unnoticed, and the jaundiced appearance and evident illness of the beast alone afford us indications of what it may have suffered.

In cases of jaundice, let the region of the liver be well and carefully examined; it is important to determine how far this organ is affected, if possible; under all circumstances (unless the animal be in a state of weakness and emaciation), the abstraction of a small quantity of blood is advisable; and if the animal suffers spasmodic pain, let an opiate (an ounce of laudanum, or a drachm of pulv. opii. in gruel) be given; follow this up, after a few hours, by purgatives of Epsom salts, in six-ounce doses, with ginger, aided by copious injections. If there be no spasmodic pain, and the usual symptoms of jaundice only appear, aperients, mashes, and low diet may be successful. Some practitioners recommend aloes, Barbadoes soap, and Venice turpentine; but simple aperients are more safe, and quite as efficacious. Should the liver be swollen and tender, blisters, setons, and perhaps even calomel (though it should never be rashly administered), may be requisite. After all, jaundice is not one of the most tractable of diseases, and when once confirmed will often bid defiance to the efforts of the most skilled veterinarian. All nostrums in this disease (and many there are in vogue among the ignorant), as saffron, &c., are either absolutely inert or injurious.

INFLAMMATION OF THE SPLEEN OR MILT.

The symptoms of this disease are obscure; seldom, perhaps, is the spleen affected independently of other organs, as the heart, lungs, and liver. Yet pure inflammation and disorganization of the spleen occasionally occurs; but all our knowledge of this affection is derived from the authority of others.

Professor Volpi, clinical lecturer at the Veterinary College, Milan, in a work published in 1813, says, that "cattle are subject to a very acute kind of inflammation of the spleen, which generally destroys them in three or four days; it is not, however, of a contagious nature, for it does not attack any other species of animals; nor can it be attributed to marsh miasmata (the surgeon will remember the affection of the spleen connected with ague in the human patient), because it sometimes happens in very dry situations. We generally subdue this formidable disease by free and repeated bleedings, by giving nitre in a quantity of from two to four ounces a day, to which we may add two ounces of aloes, and six ounces of Glauber salts."

INFLAMMATION OF THE BRAIN, PHRENSY, MAD STAGGERS OR SOUGH (PHRENITIS), AND APOPLEXY.

Inflammation of the brain is a common disease in cattle, resulting from plethora, high feeding, over-driving, ill-usage; it occurs most generally in sultry weather, and in animals which have fed upon a stimulating diet. The beast at the commencement of the disease is dull, it hangs down its head, and seems oppressed with stupor, the action of the heart is greatly increased, and the pulse is hard and rapid; the pupils are dilated, and the muzzle hot and dry; gradually wild delirium comes on, the eyes are inflamed, protruded, and fierce; the animal is roused to fury, staggers about, bellowing hideously, and, as if actuated by a sudden impulse, rushes at every living thing which may catch its eye. After madly plunging, and rushing with furious energy, it suddenly falls and lies awhile senseless, or, perhaps, struggling convulsively; in a short time it regains its feet, and again exhibits every symptom of fury; again it falls, and again rises, till at length it sinks comatose and dies.

It is only at the commencement of the disease—even if it were possible, without risk of human life, afterwards to attempt anything—that medical treatment will generally avail.

Bleed from a free orifice, even to fainting; and give a quick purgative consisting of aloes, half an ounce or one ounce, with half a pound of salts, and water; some recommend a scruple or half a drachm of the powder of croton-nut, in water or gruel; setons of hellebore in the dewlap are also advisable. Occasionally cattle have been restored, even when the attack of phrensy has come on; but it is then very difficult to secure a beast; if, however, this be effected, the lancet and active purgatives are the only remedies to be trusted.

Apoplexy is a disease to which cattle are subject, and from the same causes as produce *phrenitis;* it is, however, far more sudden in its attack. It consists in a violent rush of blood to the brain, which gorges the vessels to the utmost, when the animal falls, struggles perhaps for a short time with great force, and then sinks into a kind of stupor, and dies. Sometimes a vessel ruptures, and effusion of blood on the surface of the brain takes place. In some districts apoplexy is called blood-striking, and the word is not unhappily applied. In these cases, while life continues, the only chance is in bleeding freely from a large orifice; should this in a measure restore the animal to itself, the same measures as in inflammation of the brain must be adopted.

Inflammation of the brain, when the animal becomes furious, is often mistaken for *rabies*, especially if any suspicion exist that a *rabid dog* has been in the neighbourhood, or if a strange dog has been seen about the farm or cow-house. It is not easy to distingush always between rabies and phrensy. Mr. Youatt says, that a rabid ox will plot mischief, and endeavour to lure his victims within his reach; while the phrensied ox rushes blindly at everything. In the former the saliva and foam are discharged from the mouth in greater quantity than the latter.

A beast which has been dragged through an attack of phrenitis or of apoplexy, is liable to a recurrence of the disease. We recommend, as a general rule, that after due preparation by purgatives, mashes, scanty fare, &c., it be fattened for slaughter; or, if this be inconvenient, that as soon as recovered it be disposed of for that purpose.

ENTERITIS, OR INFLAMMATION OF THE PERITONEUM OR LINING MEMBRANE OF THE ABDOMEN AND INVESTING MEMBRANE OF THE INTESTINES.

Enteritis, or inflammation of the bowels, as it is commonly called, generally attacks cattle of middle age and robust health, and may result from sudden exposure to cold, or to drinking cold water when overheated, to impure water, to mildewed food, or to a diet generally too stimulating. Occasionally it prevails in certain districts, as if epidemic, occasioned probably by some acrid or unwholesome plants abundant in the localities, on which cattle feed; the disease appears to be most prevalent in hot summers.

Enteritis comes on suddenly: the first symptoms are shivering, dulness, loss of appetite, dryness of the muzzle, a rapid but small pulse; the hair is rough, the loins tender, the abdomen swelled on the left side, and incapable of enduring pressure; the bowels are confined, the animal moans, and often turns its head to the side. If the disease be not now checked, the hind limbs tremble and show signs of deplorable weakness, the animal staggers if it attempts to move, its flanks heave, the head is stretched out, the eyes are red and betray great anxiety, the moans indicative of intense suffering increase in frequency, and the rapidity of the small pulse is further accelerated. The bowels continue obstinately confined; the fæces are hard and glazed with slime, but occasionally liquid fæces are forced with dreadful agony through the indurated mass obstructing the lower bowels; the mouth foams; the animal grinds its teeth; the abdomen is tucked up, though the swelling of the left side is still prominent; the urine is thick, turbid, and exhales an offensive, penetrating odour. The animal now sinks, consciousness begins to fail, it rises up again with a convulsive effort, but again sinks down; the head is rolled about or raised only to come heavily to the ground, till the scene terminates either in convulsions or in a state of torpor.

Dissection after death shows, very often, an extent and violence of inflammation which are truly astonishing. Not only are the subcutaneous muscles of the abdomen in a state of congestion, but even putrescent; and the subcutaneous vessels of the cellular tissue are gorged with black blood. The abdomen is filled with a bloody effusion; the peritoneum is more or less universally inflamed; and black gangrenous patches appear in various parts of the intestines; the lining or mucous membrane of the intestines is also inflamed and ulcerated; the liver is enlarged and softened; the lungs are in a state of congestion, and there is effusion both in the chest and pericardium. The fourth stomach is highly inflamed, and dry hard layers of food are found in the maniplus, while the paunch is generally found distended with dry vegetable matters. We do not say that all these morbid appearances present themselves together; but ulceration, abdominal effusion, and congestion of the lungs, are almost always present.

When enteritis, or inflammation of the bowels, and especially the small intestines, is accompanied by severe inflammation of the mucous lining of the fourth stomach or abomasum, the French distinguish the disease by the name of gastro-enteritis. But in gastro-enteritis it is chiefly the mucous membrane of the portion of the intestine succeeding the stomach, viz. the duodenum, which is inflamed.

With respect to the treatment in pure enteritis, that is, inflammation of the peritoneum, it is very clear that prompt and energetic measures alone can be serviceable. Let not the *smallness* of the pulse deter from bleeding; blood should be taken even till symptoms of fainting appear; to this should succeed purgatives, the first a full dose, followed at intervals by smaller doses, till the bowels act freely; these should be assisted by injections. The abdomen should be fomented with hot water, and blistered, and gruel and mashes alone given. Anodynes, that is, preparations of opium, are very useful. Immediately after bleeding an anodyne may be given, half an hour before the aperient medicine; it may simply consist of half an ounce or an ounce of laudanum (tinct. opii), or half a drachm of powdered opium (pulv. opii), in gruel. The aperient may consist of nitre (four drachms), cream of tartar (four drachms), castor oil (six ounces), carbonate of soda (four drachms), and Glauber or Epsom salts (eight ounces), in gruel. The following is another form of aperient, which may be useful :—Barbadoes aloes (six drachms), common salt (six ounces), ginger (two drachms), water (one quart), tincture of opium (two or three fluid drachms). If this aperient be used, the anodyne draught need not be given; but in severe cases we should prefer relieving the pain as soon as possible. For this purpose we must trust to bleeding and opium, followed up by aperients and injections.

Enteritis must be carefully distinguished from *colic*, whether *flatulent* or *spasmodic*; for though the *latter* may end in inflammation, the pain in the first instance results from another cause. Though colic can scarcely be classed among inflammatory diseases, yet it will be useful to notice it in the present place, in order that its symptoms may be compared immediately with those of enteritis.

COLIC, OR FRET.

We will first notice that variety to which the name of *flatulent colic* is given.

Flatulent colic arises from the distension of the alimentary canal with gas, owing to the fermentation of the food. The abdomen swells; the animal moans with pain; it is extremely restless, continually getting up and lying down, and ever and anon striking at the belly with the hind feet, or with the horns. Gas is expelled at intervals both from the mouth and bowels; perhaps the animal appears for a while relieved, but the pain again commences: often there is a rumbling noise, caused by the passing of the gas from one part of the bowels to another, or by the peristaltic action altering the position of inflated portions. There is no violent shivering succeeded by symptoms of burning fever, though the pain may quicken the pulse; there is no prostration of strength; and during the remission of pain the animal moves freely. The most effectual remedy for this disease consists in the chloride of lime, of which two drachms may be mixed with a quart of warm water, two drachms of powdered ginger, and twenty drops of essence of peppermint. While the aromatics are grateful stimulants to the bowels, the chloride of lime unites with the extricated hydrogen gas, and causes the greater portion of it to disappear. The beast should be walked about, but not violently driven, less rupture or entanglement of the intestines take place, and the animal be thus lost from want of common prudence.

It will be advisable now to give an aloetic purgative, assisted by injections. This may consist of Barbadoes aloes (six drachms), common salt (six ounces), ginger (three drachms), and tincture of opium (two or three fluid drachms), with a quart of water. Accumulations of *un*-bruised oats will often bring on violent colic, not unlikely to end in inflammation.

Spasmodic colic is distinguished from the former by the absence of any great tumefaction and tension of the abdomen; it does not so much arise from the presence of a large quantity of gas in the bowels, as from acrid food and other irritating substances. The agony is accompanied by evident spasms, which have their intermissions and again return; but little gas is expelled from the alimentary canal; the animal moans, paws the ground, strikes at its side with hoof and horn, and, in its excruciating pain, sometimes even lunges at its attendant. This kind of colic, if it continues, is apt to run into inflammation; and it is a point which must be borne in mind. The first thing to relieve the pain and spasm will be a dose of laudanum (one fluid ounce) with sulphuric ether (half an ounce), in thin warm gruel; should it appear, from the continuance of the pain, that any inflammation has taken place, blood must be immediately abstracted, and, whether or not this be done, aloetic purgatives must be administered, assisted by injections.

Great attention must be paid, on the recovery of the the animal, to its diet, as the least irritating cause is apt to bring back all the bad symptoms.

Spasmodic colic, if it continue, is known occasionally to produce an entanglement of the bowels; their wreathing peristaltic action is irregular; they infold each other in their spasmodic disturbance, and sometimes become knotted into loops and intricate folds, among which a portion of the intestine becomes tightly embraced, strangulation of the bowel being thus effected. Inflammation now comes on, and death soon supervenes: there is no remedy. This kind of strangulation or *knot* is mostly caused, when it occurs, by brutal and improper treatment: the animal in its agony is relentlessly driven about, perhaps by a dog, the owner ignorantly supposing that such violent exercise is serviceable; the hurried irregularity of the peristaltic action is thereby increased, the spasmodic constriction of the muscular fibres of the bowels is more vehement, they intertwine each other, the fatal noose is tightened, perhaps the mesentery is ruptured, and death ensues; and all this might have been prevented.

Another result of continued spasmodic colic is what is termed *introsusceptio*;—that is, one portion of the bowels, being perhaps spasmodically contracted, is forced forward by the strong peristaltic action of the intestines, and so runs into the succeeding dilated portion, perhaps to a very considerable extent; often the peristaltic action of the intestines is inverted, and in that case a lower portion of the bowel is forced into the portion preceding it. The latter, as far as we have observed in animals, appears to occur the most commonly. The agony resulting from this introsusception, or infolding and sliding of one portion of intestine into another, must be horrible; the mesentery is generally lacerated; inflammation comes on, and the animal dies. The symptoms indicative of this occurrence are indefinite, and the same observation applies to strangulation. But we may suspect the mischief from the increase of pain and the inutility of medicines. If anything is likely to prove beneficial it must be bleeding, conjoined with opium.

INFLAMMATION OF THE MUCOUS MEMBRANE OF THE FOURTH STOMACH OR ABOMASUM, AND OF THE SMALL INTESTINES (GASTRITIS AND GASTRO-ENTERITIS).

Inflammation of the abomasum (gastritis), or rather of its mucous membrane, is a most serious disease, nor is it of very unfrequent occurrence; generally the inflammation is not limited to the abomasum, but extends through the duodenum. This is the gastro-enteritis of authors. It appears to be brought on in most instances by improper food, by acrid plants, by bad water, by musty hay, and other causes which are not easily ascertained.

The symptoms of this disease (for we need not minutely distinguish between gastritis and gastro-enteritis) are heaviness, loss of appetite, disturbed breathing, fever, a hot dry muzzle and tongue; sometimes diarrhœa, occasionally vomiting; and in milch cows, either a cessation of the milk or an alteration in its quality; it irritates or even inflames the udder, and the milk when drawn off is thin, yellowish, and stringy, with threads of coagulum. Its smell is often offensive, and sometimes it has a reddish tinge, as if slightly coloured by blood.

According to M. Gellé, "Among the most constant symptoms of inflammation of the gastro-intestinal mucous membrane is loss of appetite, with the arrest of rumination. If the inflammation be intense, the tongue seems to be contracted, and is evidently straighter and more rounded than is natural; the papillæ which cover it become elevated and injected; the tongue moreover is red towards its point, and also along its edges. In certain intense cases of gastritis, and in some serious affections of the paunch or the abomasum, the duodenum and liver participate in the inflammation, and the tongue is yellow or green. This colouring sometimes extends to all the visible mucous membranes. Vomiting, when there has been primitive or secondary affections of the stomachs, denotes almost always a most intense inflammation, either, as is most commonly the case, continued from the abomasum or pylorus, or also from the gullet itself. Hence it is common in chronic gastro-enteritis and rare in acute. Nevertheless, if one part of the food is vomited and the other passes from the abomasum into the duodenum, it may be presumed that the seat of the inflammation exists principally in the abomasum.

"The diminution and even the cessation of the secretion of milk, constant in cows labouring under gastritis, is only the result of the displacement of the vital action of the secretory organ, in consequence of the violent action which attacks the mucous membrane of the digestive organs." In other words, there is an immediate sympathy between the udder and true digesting stomach or abomasum; and the inflammatory condition of the mucous membrane of the latter produces an immediate effect on the former, both as to the quantity and quality of its secretion.

This disease, like all others of an inflammatory type, varies in intensity. In mild cases a moderate abstraction of blood, with purgatives of Epsom salts and sulphur, with a little olive or castor oil, will prove beneficial, the diet being confined to gruel and mashes. In severer cases, the bleeding must be carried to its full extent, and even repeated, followed by purgatives and doses of opium or laudanum; injections should also be resorted to, and a seton in the dewlap may be useful.

We cannot but remark that this disease is one which the professed veterinary surgeon alone can understand, and which he alone can treat. When the farmer, then, sees his cow feverish, uneasy, without appetite, perhaps sick, and finds the milk changed from what it ought to be to a disgusting secretion, which, if an honest man, he will not mix with that of healthy cows—let him send for the veterinary surgeon (not the cow-leech), and trust the case into his hands. And here we may state that one object we have in view is to make the farmer and cattle-keeper cautious, and distrustful both of his own opinion and that of the village oracle, half blacksmith half doctor, who is quite as fit to attend the good man on his sick-bed as he is one of the animals in the yard or cow-house.

Let us now attend to another disease intimately connected with inflammation of the mucous membrane of the alimentary canal: we allude to dysentery, which we cannot well notice without taking diarrhœa also into consideration.

DYSENTERY AND DIARRHŒA.

These two diseases are both characterized by excessive alvine evacuations; and the latter disease, viz. diarrhœa, which is simple purging, may run on into the former. Dysentery we conceive to be always connected with congestion or inflammation of the mucous lining of the intestines, involving disturbance of the functions of the liver and the true digesting stomach. In true dysentery we have fever, tenderness of the loins and abdomen, frequent and perhaps bloody purging, accompanied by tenesmus and spasms, as in colic. Dysentery is often the concomitant of other disorders; but here we speak of dysentery as an acute disease *per se*, occasionally merging into a chronic form, and too often resulting in death.

True dysentery begins with shivering, succeeded by decided febrile symptoms and pain in the bowels, with mucous alvine evacuations, loss of appetite, and nausea; tenesmus and muco-sanguinolent purging succeed, not without pain; the pulse is hard, small, and frequent; the tongue dry; the urine scanty; prostration of the strength rapidly comes on, and the pulse becomes feeble; the tongue is covered with a brown fur; offensive and dark-coloured alvine evacuations now occur; the body is emaciated, the limbs totter, they become spasmodically contracted, torpor and death ensue. Sometimes, after a degree of apparent convalescence, the disease returns and assumes a chronic form; the food, mixed with mucus and blood, passes through the bowels only half digested; the pulse is feeble; there is great emaciation of the frame, dropsy ensues, and the animal dies worn out. On examination after death the mucous membrane of the bowels, but especially of the large intestines, is found to be inflamed, ulcerated, or gangrenous; in chronic cases the peritoneum participates in the inflammation, and adhesions and effusion of serum are the result. In the first inflammatory attack of dysentery, the abstraction of blood is required, and this must be followed by opium and calomel (a drachm of each) in thick gruel, repeated in a day or two if necessary, with mashes in the interval. No green or succulent food must be allowed; and the animal should be well housed and littered. There may be occasion to repeat the opium and calomel three or four times, or even oftener, till the bowels begin to act naturally, when oleaginous aperients may be given.

Diarrhœa or purging may arise from various causes, and may mostly be regarded as an effort of nature to get rid of some irritating matter in the alimentary canal. This cannot be called a disease. But diarrhœa often assumes a very severe and obstinate character, and runs at last into dysentery. It commences with a frequent and abundant evacuation of fœtid matter, owing perhaps to a sudden change from dry to green food, to impure water, or to some particular state of the atmosphere; in a short time the purging becomes more severe, and the evacuations become mucous; the animal suffers severe griping pain, rapidly loses flesh, and at length wastes away to a skeleton. Milch cows and calves are more subject to the disease than oxen. The cow ceases to yield her usual supply of milk; she appears cheerful, eats and drinks; but the diarrhœa or scouring is incessant, and at last she dies. On examination after death the lining membrane of the fourth stomach or abomasum will generally be found much thickened and pallid, with effusion of serum between it and the muscular coat; and these appearances extend to a greater or less degree through the alimentary canal. There is not unfrequently effusion also in the cavity of the abdomen, and that to a considerable extent.

It is evident that in these cases the disease begins in a low inflammation or state of irritability of the mucous membranes; and all attempts to check its progress by astringents and aromatics will be useless, unless the healthy condition of the mucous membranes be first restored. In the commencement of the disease, as soon as its obstinate character is revealed, the abstraction of a small quantity of blood may be serviceable, and a dose of chalk, mercury, and opium may be given daily in the following proportions:—Chalk, one ounce; opium, one drachm; calomel, half a drachm; ginger, two drachms. These may be mixed in thick gruel. Some recommend the addition of three or four drachms of catechu; but we fear that powerful astringents may rather produce mischief than benefit. Indeed, if the above prescription acts in restoring the healthy condition of the mucous membrane, it may be necessary to give castor oil occasionally, in doses of a pint, with ten grains of powdered opium. The diet should consist of good sound hay, given in small quantities, and a handful or two of wheat flour may be stirred up in the water. After all, this kind of diarrhœa is not easily subdued, and too often wears down the animal, which dies emaciated and dropsical.

In some diseases, as pneumonia, the occurrence of diarrhœa may be regarded as favourable; but in other diseases, as consumption, it is one of the symptoms of approaching dissolution: it may be moderated perhaps by astringents, as chalk, one ounce; powdered catechu, two drachms; powdered allspice, two drachms; powdered carraway-seeds, half an ounce. Let all these ingredients, except the chalk, be simmered in half a pint of water; then add the finely powdered chalk, mixed in half a pint of ale. To this a small quantity of opium may be added if the purging be accompanied by griping pains.

In simple but acute diarrhœa, before it assumes a dysenteric form, an oleaginous purgative, in order to remove the cause of the irritation of the bowels, may precede the mixture of chalk, opium, calomel, and ginger; this latter medicine may then be repeated twice a day, or only once if the purging be not violent. If given twice a day, half a drachm of the opium will suffice with each dose. Should febrile symptoms make their appearance, indicative of mischief in the mucous lining of the alimentary canal, bleeding may be followed by the chalk, calomel, and opium, as above directed. Injections of starch with laudanum, or gruel, or linseed-tea (infusion of linseed) with laudanum (half an ounce), will be serviceable in acting as emollients and sedatives, and should not be neglected.

INFLAMMATION OF THE KIDNEYS.

The kidneys in the ox are of large size, and, unlike those of the sheep, lobulated in structure; that is, they consist of numerous distinct lobules united together. These organs are subject to several affections, as red water, gravel, calculus, and also pure inflammation. Acute inflammation of the kidneys may be produced by blows on the loins, by violent muscular exertion, by exposure to cold, and by bad or musty food.

The first symptoms are, a frequent desire to void urine, accompanied by a straining effort, which causes the ejection of small quantities only (strangury), a tenderness and heat on the loins, dulness, loss of appetite, and fever. In a few days these symptoms increase, and the urine, instead of being limpid, is tinged with blood; streaks of pure coagulated blood also appear in it. The horns and ears are cold, the muzzle dry, the pulse hard and quick, the breathing accelerated. Severe dysentery or diarrhœa now comes on, with violent straining; the alvine excretions are scanty and fœtid: at length they cease, though the straining continues as severe as before. The animal moans heavily from intense pain; its back becomes bowed as it stands crouching; the difficulty of passing the urine increases, and at length total suppression ensues. The animal trembles, breaks out into sweats, and utters distressing groans; the hind limbs become paralyzed, the pulse sinks, and the poor beast falls to rise no more.

After death the inflammation of the kidneys is found to extend to the large intestines, and in cows often to the uterus, and the blood is strongly tainted with urine. The treatment in such cases must be prompt and decided. The first thing to be done is the abstraction of blood, and that in no stinted quantity; the loins must be fomented with hot water for a considerable time, and afterwards covered with a large mustard-poultice, or rubbed with an irritating ointment, composed of one drachm of tartarized antimony and five or six of lard. This will produce pustules and great irritation of the skin: blister-ointment, from the well-known effects of the cantharis on the urinary organs, is inadmissible. Purgatives must be administered, and emollient injections of gruel, or linseed infusion, and laudanum. The food should consist of bran-mashes and gruel. The purgatives to be selected are oleaginous, as castor or linseed oil: they must be persevered in until the bowels are fairly unloaded and their action is natural.

During the inflammatory symptoms no diuretic medicines certainly should be given; they will only stimulate fruitlessly or injuriously the inflamed kidneys, which will soon begin to act naturally when the inflammation is subdued. In the *Veterinarian* for 1840, however, Mr. Rush recommends the following draught, at first twice and afterwards once a day:—"Oil of juniper, half an ounce; oil of turpentine, one ounce; tincture of opium, one ounce; linseed-tea, a pint." This mixture, he states, proved beneficial in some cases which he treated for several days without any amendment. These draughts appeared to cause an increase of the discharge of blood at first; but afterwards it began to abate, and diminished daily. This medicine may be useful when the discharge of blood continues after the pain and strangury have been subdued; but we should prefer trying laudanum and linseed-tea alone. Some practitioners, under these circumstances, recommend astringents; as two drachms of powdered catechu, three drachms of alum, half a drachm of opium, and two drachms of ginger, which are to be simmered in half a pint of water for a few minutes; to this decoction must be added a pint of ale, to form a drench, which may be repeated in a day or two. That this mixture will act as an astringent cannot be doubted: but we question its effects on the kidneys.

BLAIN OR GLOSS-ANTHRAX, INFLAMMATION OF THE TONGUE AND PARTS ADJACENT.

The causes of this disease are very obscure. Some attribute it to the eating of certain acrid plants, as various species of ranunculus, &c., but on doubtful grounds. It sometimes appears as an epidemic; and in its latter stage it has been proved to be contagious. Its attack is generally sudden, and variable as to severity; but the affection not unfrequently runs on to gangrene of the tongue and parts adjacent, accompanied with malignant typhus, and the animal dies a miserable object.

At the commencement of blain the animal exhibits the ordinary febrile symptoms, with dulness and the refusal of food. A discharge of saliva from the mouth now appears and rapidly increases: it is at first limpid, but, as the disease gains ground, it becomes purulent, bloody, and extremely fœtid. The inflammation now extends itself; the head and throat swell, often to an alarming degree; the pharynx, or back of the cavity of the mouth, partakes of this congestion and intumescence, to the obstruction of breathing; and sometimes this is carried to such an extent that suffocation is the result. In cases where this event does not take place, large ulcers break out around the tongue and beneath it, and gangrene spreads its destructive ravages; a state of low typhus accompanies this disorganization, and the animal perishes.

If the mouth of a beast labouring under this disease be examined, the tongue will appear to be singularly elevated and swollen; underneath it and around its sides appear numerous large vesicles or bladders, varying in colour from red to a dark livid hue. Sometimes these vesicles appear even on the upper part of the tongue; they burst and form deep ulcerations; and as they burst, others appear in their turn, till, at last, the tongue and parts adjacent are covered with virulent ulcers. The sides of the tongue become gangrenous; incisions into it neither produce pain or bring blood: the disease has now run its fatal course.

The appearances on dissection, after death, are ulceration and mortification of the tongue, inflammation of the muscular and glandular mass between the branches of the lower jaw, inflammation and ulceration of the pharynx, œsophagus, the paunch, and abomasum, sometimes even accompanied by patches of gangrene. The vegetable matter in the paunch exhales an overwhelming fœtid odour; that in the maniplus is dry and hard; the small intestines exhibit very often traces of high inflammation, and the large intestines as frequently manifest palpable indications of the same morbid action. It often happens that ulcers form about the heels of the foot and between the clefts of the hoofed toes, discharging a fœtid matter.

At different times this disease appears as an epidemic, both in our island and on the continent, carrying off vast numbers of cattle; though the extent of the mortality has been most probably increased by the inefficacy of the modes of treatment adopted. Mr. Youatt assures us that this disease is contagious: it is not communicated by the breath, but, like glanders in the horse, by actual contact. The beasts must graze in the same field, eat at the same manger, or drink at the same trough; and the saliva of the diseased beast must be received on some abraded, or, at least, a mucous surface. Hence it is requisite that the most stringent precautions be adopted and fully carried out. Instances are on record in which human beings have been inoculated with this malady and died. Mr. Youatt, who observes that many instances related have perhaps little foundation in truth, gives the following as well authenticated:—"A man held down the tongue of an ox, with a silver spoon, in order to examine the mouth, which had many of the characteristic vesicles. He afterwards, and without any great care about cleaning it, ate some broth with the same spoon. Not many days had elapsed when his mouth felt sore, pustules appeared on the sides of the tongue, malignant fever ensued, and he died. When this disease raged at Nismes, in 1731, it was communicated, not only to the human being, but to various species of domesticated animals."

It is requisite, therefore, in attending cattle labouring under the blain, to be careful that the saliva of the animal, discharged from the mouth, touch no sore or abraded part, nor lodge upon the lips. Should such an accident occur, a slight application of the lunar caustic to the spot will prove a sufficient security.

In the early stage this disease may be generally treated successfully; the mouth must be secured, the tongue and parts connected with it examined, and every vesicle freely opened with a lancet, so as to give free vent to the glairy fluid they contain; the mouth and tongue should then be well washed with salt and water, and cleansed as much as possible. If, however, the fluid of the vesicles is at all offensive, as is likely to be the case if they appear dark or livid, a solution of chloride of lime (two drachms to a quart of water) should be applied very freely and frequently. After this, smart purgatives should be given, and, if the fever be high, blood abstracted. If there be ulcers about the feet, they must be washed with a solution of chloride of lime also, and dressed with tincture of aloes and myrrh, or compound tincture of benzoin (friar's balsam), both to be obtained at the druggist's. In unhealthy sluggish ulcers, a little of the chloride (butyr) of antimony may be cautiously applied.

Should the disease be in a more advanced stage, the free lancing of the vesicles in the mouth is to be thoroughly

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effected, and the lotion of chloride of lime applied copiously several times a day. Physic must be given; but whether blood should be abstracted or not will now depend on the pulse and the character which the fever assumes. If sloughing of the tongue has taken place, the same plan must be followed out, the solution of the chloride of lime being gradually strengthened; and should the ulcerations or sloughing parts show a healthy surface, they may be washed with tincture of myrrh. The animal should be supported upon good gruel, poured gently and slowly down the gullet if the beast refuse to take it; the horn, however, is not often needed. It may be necessary to give tonics also, as gentian and ginger, in doses of two drachms each, mixed with gruel and half a pint of good ale, twice a day.

In this disease many absurd and even disgusting nostrums have been administered, and some unsafe plans put into practice, to the disgrace of those whose common sense ought to have taught them better. That the village blacksmith or cow-leech should boast his quack remedies and his pretended skill is not to be wondered at; but that he should impose upon persons who in all other affairs show discernment, is indeed surprising. Perhaps, however, we do not make sufficient allowance for human credulity, and forget that there is as much pleasure "in being cheated as to cheat."

From experiments which have been made, it would appear that the blain is one of those diseases which seldom occur a second time in the same individual. How far, when the epidemic is spreading abroad, would it be advisable to inoculate for it, and then, watching the result, commence the treatment of the disease, upon its first appearance, when it is easily manageable? We are not aware that any experiment, with this object in view, has ever been made.

THRUSH, OR APHTHÆ OF THE MOUTH.

In many respects this disease bears a close resemblance to blain; it commences with inflammation of the mouth, attendant perhaps upon some disease; and in a short time the sides of the tongue, and inside of the mouth generally, are covered with small pustules, which break and ulcerate. There is seldom much fever or loss of appetite; and a few aperient doses, with a lotion of tincture of myrrh, alum, and water for the mouth, will generally prove successful in the course of a week or ten days. Sometimes, however, the ulceration spreads alarmingly, and the symptoms begin to be formidable. If the pulse permit (for great debility then comes on quickly) some blood must be taken away, and the mouth well washed with a solution of chloride of lime, and afterwards with tincture of myrrh. Thrush is generally connected with derangement of the digestive organs produced by damaged food, foul water, and similar things; but sometimes it appears as an epidemic, especially on the continent, where the disease assumes a more dangerous form than in our island, the inflammation extending to the throat.

In catarrhal affections vesicles called barbs or paps, of a red colour, sometimes appear in the mouth, but oftener when its membranes are inflamed; these the cow-leech will sometimes ignorantly remove by the scissors or hot iron, producing unpleasant ulcers. In such slight cases a few doses of physic are all that is required; or, should some degree of ulceration take place, an alum wash is sufficient to heal them. These little bladders often appear over the sublingual glands, the orifices of which are enlarged and distended with saliva.

We may here also observe that the submaxillary and parotid glands are, from various causes, subject to acute inflammation and swelling, called *strangullion;* and sometimes abscesses are formed, which become malignant, and are difficult to cure. This is more especially the case with the parotid gland (under the ear). In catarrh, and in epidemic diseases of a severe character, the parotid glands are generally hot, swollen, and painful, rendering the action of the lower jaw very difficult. The swelled gland, moreover, presses upon the adjacent blood-vessels, impeding the current of blood.

Hot fomentations, frequently applied, are useful; and, when suppuration has commenced, it should be encouraged by hot poultices, and the abscess freely opened as soon as the fluctuation of the purulent matter is clearly distinguishable; the abscess will then generally fill up; but if allowed to burst of itself, ulcers, often of a phagedenic character, or apt to become gangrenous, will be the result. For these ulcers washes of chloride of lime must be used, and afterwards dressings of tincture of aloes.

During the inflammatory stage there will be considerable fever, rendering the abstraction of a little blood advisable, with aperients and sedatives; but when ulceration has commenced, tonics should be administered. The food should consist of gruel and mashes requiring but little mastication. Contusions, and the blows of cattle-drivers, merciless in the use of their sticks about the heads of the poor beasts subjected to their barbarity, are not unfrequently the cause of inflammation and suppuration of the parotid gland; but the disease very often commences spontaneously, or is sympathetic with general derangement of the system.

ACUTE RHEUMATISM.

Rheumatism is a disease to which horned cattle are peculiarly subject, from exposure to wet and cold, and the vicissitudes of the weather, more especially in the early part of spring. Cows after calving, and beasts in general in a weak state from recent illness, if not shielded from piercing cold, are extremely liable to this affection. It consists of inflammation of the fascia of the muscles, the ligaments of the joints, and the synovial membranes. Sometimes the inflammation extends to the chest, and involves the pericardium. Acute rheumatism commences with fever and loss of appetite; the animal moves stiffly, action being painful; the spine seems to have lost its elasticity; the loins are tender when pressed; and the animal is unwilling to stir. In this stage it is called by farmers chine-felon, an expression which has no definite meaning. In a short time the joints swell, and cannot be bent without intense agony; they are very hot, and often the veins around them assume a varicose appearance; the disease is now called joint-felon. Ulceration of the cartilages of the joints frequently supervenes; the hind quarters become weak and contracted, or even palsied; the animal is no longer able to stand; and, after lingering for some weeks almost incapable of motion, is relieved from misery by death.

Rheumatism appears in a chronic as well as in an acute form, especially in old cattle which have been worked hard and exposed to frequent alterations of temperature, or in aged cows subjected to damp or wet. In fine warm weather little appears to indicate the existence of rheumatism, except perhaps that some of the joints of the limbs are swollen: but in bitter weather, when keen east or north-east winds prevail, or when sleet and snow are falling, then the animals droop, and move about stiffly and in pain.

Acute rheumatism is not easily cured; when it appears to be so, it is apt to return; or it may assume a chronic form, and, though subdued for the present, show itself on the first exposure of the beasts to cold or wet.

In the early stages a free abstraction of blood is indicated:

active aperients also are required, in which sulphur should constitute an ingredient. After the bowels have been well purged, a dose consisting of nitre, two drachms; tartarized antimony, one drachm; and spirit of nitrous ether, one fluid ounce, may be given in warm gruel twice a day. To this mixture opium (from half a drachm to one drachm) may be occasionally added. The affected joints must be fomented with hot water or decoction of poppy-heads; and the following embrocation may be used:—Camphorated oil, four ounces; oil of turpentine, two ounces; laudanum, one ounce.

The animal must be comfortably housed, and supplied with gruel. If the swelling of the joints, indicating the excess of synovial fluid, continues after the acute inflammation is subdued, they should be well rubbed, once or twice a day, with an ointment of iodide of potass (one part of the latter, by weight, to seven of lard). This ointment will be found effective in dispersing tumours, enlargements of the glands, and indurations of the udder. Besides being applied externally, three or four grains of iodide of potass (the dose being increased to six or eight grains by degrees) may be given in a small mash morning and evening.

With respect to the treatment of chronic rheumatism, few explicit directions can be given, excepting that such cattle ought never to be exposed to cold winds or driving sleets. If turned out during the middle of the day, in winter, they should be comfortably housed in the evening.

Tumours of the knees often occur in cattle out at pasture in damp grounds. The swelling occupies the fore part of the knee, and its elasticity indicates the presence of fluid in the tissue immediately beneath the skin. At first there is but little pain: in course of time, however, the tumours increase—inflammation begins; it extends to the joint, which is painful, and soon becomes deprived of the power of motion. These tumours contain a glairy fluid; on being punctured, the fluid escapes and the swelling subsides. Stimulating liniments, blisters, and the hot iron have been used with variable success.

Sometimes hard tumours make their appearance: it is generally to one knee only that this sort of tumour is confined; it does not yield to pressure, is painful, and the animal is lame. Occasionally deep firing has succeeded in removing it, when blisters, and even a seton through it, have had no beneficial effect. In both the kinds of tumours above noticed, which are often connected with neglected rheumatism, though in some cases, perhaps, they are independent of this affection, the iodide of potass, both as an external application, and as an internal medicine, has been found very efficacious. We have already described the proportions to be used in making the ointment, and the doses to be administered.

We may now pass to the consideration of certain diseases immediately connected with the nervous system, irrespective of acute inflammation of the brain, or of any of the viscera of the chest or the abdomen. We mean those diseases in which the nerves of some part, or the nervous system generally, are immediately disturbed, irritated, or paralysed, and to the affections of which the leading symptoms have direct and express reference. Hence are these diseases called "nervous," —not that there is no disturbance of any other part of the frame; quite the contrary—but because the nerves bear the brunt, as it were, of the attack.

PALSY, OR PARALYSIS.

This disease, which bears among farmers and cow-leeches the ridiculous names of joint-yellows, tail-rot, tail-ill, or tail-slip, is by no means an unfrequent disease, especially in low, marshy situations, and during a cold and changeable spring. Scanty food, bad water, damp, ill-ventilated, and filthy cow-houses, also conduce to it. Overworked cattle turned out into humid pastures during a cold sleety night, perhaps while sweating profusely, and with no shed to protect them, are very liable to palsy.

Palsy in cattle is generally confined to the hinder quarters, and both sides are alike affected.

Sometimes the attack is sudden, but in most cases it comes on gradually. It begins with debility, and a trembling or failing of the hind limbs; the appetite is now impaired or suspended, and the animal staggers as it walks: soon the hind limbs drag along feebly, and with difficulty perform their office; the pastern joint is bent to the ground, and the animal is supported upon it; the other joints of the limbs give way in turn, and the animal sinks down upon the ground.

It occasionally happens that cows left well, or apparently so, in the pastures, at the close of day, will be found chilled and palsied in the morning; the attack has been sudden, but it may be weeks before the animals are restored, and some perhaps will never recover.

With respect to the treatment of this species of palsy, bleeding will be serviceable in the first instance, followed by warm cordial purgatives, in each dose of which there may be an ounce of ginger and half a pint of good ale. The bowels must be kept freely relaxed—this is most essential: the animal should be comfortably housed, and well littered; and a rug or coarse blanket should be thrown over the loins, which latter may be well rubbed occasionally with a stimulating embrocation, as turpentine, olive oil, and hartshorn (or liq. ammoniæ); or blisters may be produced by thoroughly rubbing in the blister ointment.* The food should consist of gruel, with a little hay and green fodder. In three or four weeks, if all goes on well, recovery will take place.

Nux vomica—or its principle, strychnine—has been recommended in these cases; and in France the former has been given with success in ounce doses. It is not a medicine to be used rashly, or by any but a veterinary surgeon, in the treatment of cattle.

EPILEPSY.

In many animals, particularly such as are kept in confinement and fed high, epilepsy is a frequent disease; but it is not of common occurrence among horned cattle, and, indeed, then it is chiefly in young cattle that it takes place. Young beasts in high condition, excited by over-driving, or a sultry state of the atmosphere, are the most liable to be seized with it. It arises from a sudden determination of blood to the head: the animal suddenly staggers, reels, and falls; the limbs are convulsed, often violently, the flanks heave with astonishing force, the jaws are clenched, the teeth grind, the mouth foams with froth, and the fæces and urine are discharged involuntarily. Sometimes the animal bellows loudly, but this is not always the case. The fit varies greatly in duration; sometimes it is over in half a minute, at other times it may last for many minutes; the convulsions gradually cease, the animal rises staggering and bewildered, it gazes around, and gradually recovering its faculties, commences its repast as before. It is seldom that an animal which has fallen in a fit of epilepsy has not a return of the complaint, perhaps even during the same day, and that more than once. The disease is, in fact, liable to become habitual, the fits following each other at shorter intervals, till in one of more than usual seve-

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[*] One drachm of tartar emetic, with six of lard, make a powerful irrita causing a pustular eruption of the skin, when properly rubbed, and is useful cases where blister ointment is inadmissible.

rity the animal dies. Bleeding, active aperients, and a restricted diet, are the only remedies, with a seton in the dewlap, or on the sides of the neck. If by these measures, actively pushed, no return of the convulsive fits occurs for several weeks, the beast may be cautiously prepared for the butcher.

CHOREA, OR ST. VITUS'S DANCE.

Chorea is a frequent disease in young dogs, and occurs either with the distemper, or after it. That singular affection of the limbs of the horse, called string-halt, appears to be a species of chorea. In horned cattle the disease is not known to occur.

TETANUS, OR LOCKED JAW.

This terrible malady is less common in the ox than in the horse, but when it comes on it is equally unmanageable. It is generally the effect of severe punctured wounds; in working oxen it may be produced by incautious shoeing, one or more nails being rudely driven to the quick. Long and severe travel will produce it, and it often makes considerable ravages among the droves of cattle, during their toilsome and exhausting journeys from the north to the southern markets. Mr. Youatt assures us, that tetanus stands at the head of the list of those diseases which sweep away the greatest number of victims from the herds travelling southwards. Unfortunately tetanus is generally confirmed before its approach even is suspected; nay, it is not then always immediately discovered. The animal stands in the field motionless, with its head stretched out, and the neck rigid. At first, perhaps, no notice is taken of this, but the animal still continues, having scarcely stirred a yard from the spot, but in the same fixed attitude; its appearance excites alarm: the muscles of the jaw are found to be spasmodically contracted, and the jaw firmly set or locked. What is to be done must be done promptly, for in a short time it will be too late to attempt anything. Blood must be taken in a full stream, till symptoms of fainting manifest themselves, and the animal staggers. This may relax the muscles, and the opportunity must be instantly taken to give a powerful aperient, as half a drachm of the farina of croton-nut in a little gruel; this medicine may be then followed up, if practicable, by full doses of salts, a pound in solution with ginger, and afterwards at due intervals (every six hours) by small doses. These medicines may be assisted by copious and repeated injections, consisting of salts dissolved in five or six quarts of water. Let the medicines be given slowly and gradually, or they will pass into the paunch, and produce no effect; but by giving them gently and gradually they pass into the fourth stomach. When the bowels begin to act freely, then recourse must be had to that powerful anti-spasmodic, opium. A drachm or a drachm and a half of the powdered opium, suspended in gum-water, or linseed tea, may be given twice or three times a day. Still the action of the bowels must be kept up by doses of salts, sulphur, and ginger, and a seton may be introduced into the dewlap. During this time the back, loins, neck, and head, should be covered with sheepskins, or thick rugs, to induce perspiration, and the jaws and neck often rubbed with a stimulating embrocation, as spirit of turpentine, camphorated oil, ammonia, and laudanum. Some persons have recommended the pouring of cold water over the body by means of buckets, the stream being continued for a considerable time; but we doubt the benefit of such treatment.

We have drawn up a favourable case; we have supposed the bleeding to have relaxed the muscles of the jaws, and the purgatives to have operated effectually.

But suppose the most profuse bleeding has not caused the relaxation of the jaws; it has been repeated, but the spasmodic condition of the muscles remains: the case is hopeless.

Suppose the medicines take no effect: in this case we may conjecture very safely that the draughts have passed into the paunch, and remain there inert. The most direct method is to have recourse to the stomach-pump, if it can be applied. The tube must be passed down the gullet, into the paunch, or rumen, and warm water be injected into that compartment till it overflows; the contents will then either be discharged by the action of vomiting, or they will pass through the third and fourth stomachs into the intestines, and the desired purgative effect will ensue. If the contents of the stomach be rejected, the aperient medicines must be again resorted to.

We are quite aware that all these plans are more easily directed than put into practice. The stomach-pump for cattle is not in the possession of every farmer, the fleam is mislaid or lost, there are no medicines to be obtained immediately—none, perhaps are kept on the farm—and the nearest veterinary surgeon is absent: under these circumstances what is to be done? Bleed, and bleed freely; a sharp penknife adroitly used will open the jugular vein; let injections and fomentations be in the mean time prepared, and let some one be sent off for the proper medicines, or for the veterinary practitioner, who, understanding the case, will (or ought to) bring them with him. Let us suppose that the beast recovers, the disease and the remedies have given a shock to the system not easily surmounted; nay, a relapse may take place, against which it is hopeless to contend. What is the plan most advisable under all these circumstances? Cautious and gradual preparation for the butcher. The food should be at first suited to the animal's enfeebled frame; gruel and mashes, with a little ale occasionally added; a small quantity of succulent green fodder may be also given from time to time, but nothing requiring laboured mastication; for the very action of the muscles of the jaws is apt to bring on sudden cramps and spasms, indicative of the irritability of the nerves which supply them. By slow degrees the diet may be amended, and the animal at length restored to good condition. After all, it is an expensive and unsatisfactory affair, and at whatever price the farmer may sell the beast, he will not be remunerated.

OBSTRUCTION OF THE GULLET, OR CHOKING.

All roots given to cattle should be first cut into small pieces; carelessness in this point is inexcusable. It is not because roots have been given several times without being chopped up, and no evil consequences have ensued, that the farmer or his servant may plume themselves on their security. If they neglect this precaution they will most surely rue it some day. One of the cows or oxen, carelessly masticating, will swallow a large portion of turnip or parsnip, or perhaps a whole potato, and it will remain fixed in the gullet; firmly impacted sometimes at its commencement, occasionally lower down, and often within a few inches of the dilatation of the œsophagus, where it joins the rumen. It may be felt externally, and there can be little mistake about the matter. What ensues?—difficulty of respiration, violent husking, spasmodic action of the muscles of deglutition, repeated and violent contractions of the abdominal muscles—all laboured efforts to expel the impacted root; the neck is strangely arched, the nose poked forward, mucus drips from the mouth, and the alvine evacuations are frequent, perhaps involuntary. But this is not all; if the animal be not relieved, it becomes hooven; that is, the stomach becomes distended with gas, the diaphragm, and consequently the lungs, are oppressed, and the animal is in imminent danger. Something must be done, and done promptly. The farmer knows it: he secures the head of the beast, puts a balling-iron or some rude gag in the mouth, and then forces down the handle of a cart-whip, a stiff piece of cord, or a long stave, in order to drive the obstructing object into the rumen. This rude treatment it is true, sometimes succeeds; but it often happens that the gullet is frightfully lacerated, and the animal dies in consequence.

Now, in these cases, if the obstructing substance be at the commencement of the gullet, it may often be withdrawn by the hand, the arm being defended by the ordinary balling-iron. But if this is impossible, the obstruction being too low down, a probang must be used. Several very ingenious instruments of this kind have been invented, some with screws in the end to fix into the substance, some with spring forceps to grasp it; a wooden gag being placed in the mouth and there secured, having a perforation of sufficient extent to allow the probang to pass through. These are no doubt admirable instruments in the hands of the practised veterinary surgeon, but we are not so sure that they would prove successful in the hands of the farmer, even if he possessed them. They require nicety and practice in their management.

When a skilful veterinary surgeon is not on the spot with these or similar instruments, a good common probang, which will not lacerate the gullet, may be readily made. A piece of stout cane, between four and five feet long, must be procured, or a long elastic peeled willow wand; this must be armed at the extremity with a piece of sponge, or cork, well secured, and covered tightly with soft leather, so as to form an egg-shaped bulb, with the broad end lowest. Lest this bulb, however well secured, should by any chance slip, let both ends of a piece of strong twine passed through it be wound round the cane, and reach beyond the handle portion. Whalebone may be used instead of cane, but long strips of this are not always to be obtained at the moment. The farmer, or cattle-feeder, however, should always have a probang and an œsophagus-tube in readiness.

In some cases the obstructing substance has been found to be so rigidly impacted, that its removal by any other means than by opening the œsophagus is impossible. This operation can only be attempted by a good anatomist. Sometimes it is even necessary to puncture the distended rumen in the left flank, for the purpose of letting out the gas, which threatens suffocation.

HOOVE, OR DISTENTION OF THE STOMACH FROM GAS.

When cattle, and especially such as have been kept on scanty fare, are turned into rich pastures, or stray by accident into fields of clover, lucern, or the like, they are apt to eat ravenously, and take in a larger quantity of food than the powers of digestion are capable of managing. The rumen is overloaded; its contents, from the effects of warmth and moisture, begin to ferment, and large volumes of gas are rapidly evolved; the rumen soon becomes awfully distended, even to bursting, for the pillars of the œsophagean canal are closed tightly, and prevent the escape of the gas through the œsophagus; and the more the rumen is distended, the more firmly is this canal closed. The rumen now presses on the diaphragm; respiration and the action of the heart are greatly impeded; the whole body of the animal, especially the left side, is blown up till the very skin seems about to give way; the tongue hangs from the mouth dripping with spume; the eyes are bloodshot and glazy; deep moans attest the torture of the poor beast; it crouches with its back bent up; insensibility comes on; it staggers, it falls, it struggles convulsively, and dies. We have known cows, well at night, found dead in the morning from hoove, having strayed into an enclosure of lucern or clover.

The first object in these cases is to procure the liberation of the gas (at first carburetted hydrogen, but as the disease continues, sulphuretted hydrogen), and this must be done promptly. The œsophagus-tube, with its perforated bulb and stylet, must be introduced through the œsophagus into the rumen, and the stylet withdrawn; a quantity of gas then escapes, the flanks sink, the breathing is more easy, and the animal is relieved. But this tube cannot be kept in the gullet for any great length of time; it must be withdrawn, and in the mean time gas again accumulates. The tube may again be introduced; and afterwards measures must be taken to relieve the stomach effectually. The stomach-pump must be resorted to, and through its tube a quantity of warm water thrown into the rumen, and pumped out again, until the acid fermenting fluid is washed away, and perhaps a considerable portion also of the coarsely masticated contents besides; after which the process of rumination may go on, especially if the stomach be roused by a pint of warm ale, with a few teaspoonsful of ginger.

Mr. Youatt recommends in these cases, after the first relief is obtained, that chloride of lime, in the proportion of two drachms to two quarts of water, should be thrown into the rumen by means of the stomach-pump, (the horn will not answer, for from the closure of the pillars to the œsophagean canal, the fluid thus administered will pass into the third and fourth stomach.) The *modus operandi* of this medicine is as follows:—Chlorine has a stronger affinity for hydrogen than for lime, potass, or soda; consequently it separates from the lime, and uniting with the hydrogen forms muriatic gas. This gas, having a strong affinity for water, is immediately absorbed by the fluid contents of the stomach, and quitting its gaseous for a fluid state is reduced to a very small volume, in the form of a weak muriatic acid, while the lime is disengaged; yet no mischief will arise either from the corrosive acid or the caustic lime, for there is an affinity between these again, so that they combine and form an inert muriate of lime.

This, says Mr. Youatt, is "not mere theory, but when brought to the test of practice is found to be verified in every particular; hence has resulted one of the most important improvements on cattle medicine that modern times have produced." Chloride of lime is, or ought to be, in the possession of every farmer, and always at hand. It may be requisite to repeat this injection into the paunch in the course of a couple of hours, should a fresh evolution of gas take place.

It often happens that urgent cases of hoove occur at a distance from the farm-house, or under circumstances in which neither an œsophagns-tube nor a stomach-pump is accessible, and something must be done immediately. Let the farmer mark the prominence of the left flank, and plunge a sharp-pointed knife into the distended rumen which there presents itself so conspicuously. This will be followed by a rush of gas, steam, fluid, and even portions of food. It is, however, necessary to introduce a tube, for the wound will otherwise close; or, if this be not attainable, the orifice must be kept open by means of a smooth piece of stick, or any other mode that suggests itself at the time, until all the gas is liberated. In this operation the danger does not arise from the wound of the paunch, which is comparatively insensible, but from other causes—viz., from a puncture of the spleen or kidney; or from the escape of the contents of the stomach into the abdomen, producing peritoneal inflammation. The spleen and kidney may be avoided if the following rule be adhered to: Let a line be drawn close along the spinal column from the haunch-bone to the last rib; from the ends of this line let two others of the same length be drawn obliquely down the flank, the whole forming an equilateral triangle; the lower apex of this triangle is the most suitable spot for the incision.

Though sometimes successful, this is a rude operation; as the stomach on the escape of the gas sinks, it too often happens that both fluid and solid matters are discharged through the incision into the cavity of the abdomen, so that, although the animal is relieved for the time, it ultimately sickens and dies. It is, in fact, only strong necessity that can justify the use of the knife; the proper instrument for performing this operation is a trochar, similar to that used by surgeons for tapping the human subject in cases of dropsy. It consists of a steel stylet, terminating in three sharp-edged facets converging to a fine point. It has a stout handle, and is sheathed in a silver canula, or closely fitting tube, from the lower end of which the point of the instrument emerges, while a rim or guard around its base prevents its slipping into the abdomen. When the instrument is plunged in, the steel stylet is withdrawn, and the canula (four inches long) is left in the wound, and secured there as long as may be necessary; it forms a continuous tube from the stomach to the outer surface of the flank, and is long enough to allow of the sinking of the rumen, without danger of the escape of its contents into the abdominal cavity. When all danger is over, the canula may be removed, and the wound closed by firm adhesive plaster. Carminative aperients, as salts, ginger, and caraway powder, may be given in order to clear the bowels, and diminish the chance of inflammation. Mashes may then be allowed, but the animal must be restricted for some time in its food.

In some districts it is the practice, we believe, in cases of hoove, to throw pailfuls of cold water over the animal; the object is to produce sudden shocks, during which the pillars of the œsophagean canal sometimes yield, and allow the gas to escape; occasionally, however, the stomach gives way instead of these muscular pillars, and the beast is lost. Sucking calves occasionally become hooven from some accidental cause; they are apt to suck various objects, even each other's ears, drawing in and swallowing a great quantity of air; they may be readily relieved by the introduction of a tube or probang.

DISTENTION OF THE RUMEN WITH FOOD.

It is not always easy to discriminate between distention of the rumen with food, and hoove. In both cases the abdomen and flanks are distended, but, in the former, the left flank feels hard and firm, and is less protuberant than in hoove, and these particulars being taken into consideration, with the character of the food recently swallowed, will generally lead the farmer or practitioner to form a correct opinion. Nevertheless, the probang and tube should be always used, lest there be gas in the stomach, and even if there be none, the instrument will serve to indicate the extent to which the rumen is filled.

This disease generally occurs in stalled cattle fed upon unboiled potatoes, uncrushed oats, and other indigestible materials. It is termed by farmers grain-sick, or maw-bound.

If the stomach be not relieved, inflammation comes on, and the animal dies; and, in severe cases, prompt measures are necessary, for the pressure on the diaphragm, and the consequent oppression of the heart and lungs, are soon followed by insensibility and death.

At all times it is desirable to know the exact nature of the food swallowed, for this may require some modification of the plan of relief to be pursued; indeed, if the rumen be distended with hard heavy materials, as potatoes, an operation may be imperatively demanded.

Should the case be not severe, the animal may be made to move about; and a drench be given, composed of carminatives and aperients, followed by other doses at intervals, till the medicine operates: injections should be also administered, and it may be advisable to take away some blood. After the action of the aperients, the process of rumination may be excited by cordials. In severer cases the animal will not be able to move, and must not be disturbed; indeed, the difficulty of respiration forbids any measures but those tending to immediate relief. Supposing that the stomach be distended by light materials, as wheat-chaff, chopped straw, and the like, the contents may be extricated by means of the stomach-pump, a quantity of water being first thrown in, and then immediately pumped out, when some of the matter will be returned with it: this process may be repeated. It may happen, however, that the tube of the stomach-pump becomes stopped up by the chaff, and the action of the machine impeded. Under such circumstances success has followed the injection of water into the rumen, until it begins to react upon its contents and discharge them by vomiting. When this ceases, carminative aperients must be given, and repeated till the bowels work freely. The drenches must be aided by clysters. The recovery of an animal in cases of this nature is generally slow; it is long before the stomach regains its tone and a healthy appetite returns; this should be remembered with reference to the diet, which ought to be restricted and consist in a great measure of gruel.

In cases when the stomach is gorged to the full with solid heavy food, as undigested potatoes, unaltered grain, and similar materials, which no stomach-pump can remove, or efforts in vomiting throw off, while approaching dissolution threatens, one plan is yet left, viz. a bold operation. A free incision of about five inches long must be made through the left flank into the rumen; a rush of the more fluid contents will immediately take place, and after the stream has subsided the operator must introduce his hand, and carefully remove all the solid masses of food, and empty the paunch completely. Great care, however, must be taken that no food escapes from the paunch into the abdomen, and the wound must be sewed up. This is a dangerous operation, less perhaps from the incision into the rumen, which will bear severe treatment with comparative impunity, than from the escape of food into the abdomen, and the inflammation it will necessarily engender, which will certainly prove fatal.

LOSS OF CUD.

Loss of cud not only proceeds from the causes to which we have just alluded, but is often a marked symptom in other complaints, and may be taken as a sure evidence of disorder of the digestive organs. In severe inflammatory diseases rumination is generally suspended, as well as in states of constitutional debility and prostration of strength. In the former case, the stomach will recover its powers as the animal improves; in the latter case, the restoration of the strength by tonics, as gentian, is required, and cordials, with gentle aperients, may be also given; as four ounces of salts, one ounce of powdered gentian, and half an ounce of ginger, with a little ale and gruel, every other morning.

Loss of cud is often produced by an accumulation of dry or noxious vegetable matter between the foliations of the third stomach or maniplus, and to this affection we shall at once proceed.

RETENTION OF FOOD IN THE MANIPLUS, CALLED CLUE, OR FARDEL-BOUND.

We have described the manyplus as a sac provided internally with numerous foliations or duplications of its articular lining, covered with multitudes of rough or hardened papillæ. In this stomach the food undergoes its last preparation for the abomasum, or true digesting stomach: it is situated between the liver and the right sac of the rumen, so that, when over-distended, it will press upon the former. Not unfrequently it may prove an obstruction to the return of blood to the heart.

As dissection after death proves, there are few severe diseases, especially of an inflammatory nature, as catarrh, enteritis, pleuritis, fever, &c., in which the maniplus is not affected; generally it contains between its duplicatures layers of comminuted vegetable matters tightly pressed, and as dry as hardened oatcake. At other times it is full of a soft pultaceous mass, emitting a putrescent and most disgusting odour. In both these cases no nutrient matter passes into the abomasum, the door of communication being blocked up. Sometimes the duplicatures of the maniplus are found to be gangrenous, and the abomasum in a state of high inflammation.

But it is not only from sympathetic inflammation, and consequent loss of function, that the maniplus is liable to suffer; it is often the seat of original disease, sometimes slow or chronic in its course, sometimes rapidly terminating in death.

The causes of this disease are obscure. It has been attributed to acrid plants; to a sudden change of diet, as from green fodder to hay, especially if bad; to coarse and fibrous food, whether green or dry. Sometimes it rages in certain districts, and produces great mortality.

As the causes are obscure, so are the symptoms. Cases have occurred in which the dry food must have been lying in the maniplus for several weeks (as was proved by the nature of the food) without materially affecting the animal's health. At other times an animal, previously in perfect vigour, is suddenly taken ill, and, in spite of all that can be done, falls and dies.

Generally speaking, this disease comes on with dulness, dryness of the muzzle, and protrusion of the tongue; the pulse is quick and hard; the membranes of the eyes and nostrils are bloodshot; the eyes are starting, the head is extended, the limbs are tottering, and the animal is unwilling to move. The bowels are constipated; the urine scanty, and either red or dark-coloured. In cows, the secretion of milk is either stopped, or the milk is offensive both to taste and smell. As the disease gains ground, the determination of blood to the head becomes more manifest, the animal loses consciousness, the abdomen swells, the frame trembles, the eyes are glairy, the limbs become cold, and the animal sinks torpid. Many or most of these symptoms occur in other inflammatory diseases; consequently the diagnosis is by no means easy, nor are there any which enable the practitioner to say whether the food in the maniplus is divested of its juices, or is in a pultaceous state; yet these differences must result from separate causes. In the first instance we must suppose a violent contraction of the maniplus from some irritation, producing a firm pressure of the comminuted vegetable matter between the leaves of the stomach, which latter, acting like a screw-press, forces out the juice and superadded moisture of the mass, converting it into hard, dry, friable layers, which may be crushed to powder. In the second instance the inflammatory action of the stomach must produce a sort of paralysis, or loss of power, so that no action is exerted on the accumulating pultaceous matter, which gradually becomes putrid. But it would appear that in some part of the stomach the leaves may exert pressure, while in another part there is loss of power.

With respect to the treatment of this disease when it occurs as a primary affection, much depends on its severity: the abstraction of blood will relieve the system; and this must be followed by copious aperient draughts, poured gently down the gullet, or slowly injected by the stomach-pump, the tube of which must be introduced for some distance into the œsophagus. The object is to throw the medicine into the maniplus, and thence into the abomasum, without its being forced through the pillars of the œsophagean canal into the paunch. A free operation of the medicine is a favourable symptom. Some writers recommend that a gentle stream of warm water, with a little Epsom salts dissolved in it, be transmitted into the maniplus, through the tube of the stomach-pump, with the object either of diluting and carrying forward the pultaceous mass; or, on the other hand, of softening and breaking down the dry friable layers, and washing them into the abomasum. We doubt not that a perseverance in this plan might be productive of benefit; and certainly it could produce no evil consequences. Should the animal recover, the greatest caution relative to its diet is requisite. This should consist only of emollient mashes and thin gruel, till the stomach is enabled to take by degrees the most simple green food.

It appears to us that two diseases, termed wood-evil and redwater, are mere modifications of this affection of the stomach, or are symptomatic of its existence; and it is under this impression that we here notice them. They certainly are intimately connected with debility and functional derangement of the digestive organs; and an accumulation of matter is always found in the maniplus.

WOOD-EVIL, MOOR-ILL, OR PANTAS.

This disease is brought on in cattle by their devouring the acrid buds of trees, by bad winter provision, by impure water, and similar causes. It comes on with febrile symptoms, heat of the mouth, and quickness and hardness of the pulse; the coat is staring, the skin hide-bound; the eyes and nostrils are bloodshot, the thirst is great, and there is obstinate constipation of the bowels. The beast loses flesh, and exhibits a capricious appetite; it will pick up bones, sticks, pieces of linen, &c., and grind them for a long time in the mouth; the filthiest puddle is preferred to clear water; the urine is generally scanty; it has a red tinge and a penetrating odour; the milk is affected and disgusting; there is an indisposition to move, and the animal utters moans indicative of internal pain; the shoulders and chest are stiff, the flanks heave, the limbs are unsteady, and the brain shows signs of congestion. Such are the symptoms in violent cases, in which, if the disease be not arrested, the animal dies. The appearances observed on dissection after death are inflammation of the bowels, of the fourth stomach, sometimes of the lungs, and a repletion of the maniplus with undigested and generally compressed vegetable matter. In these cases bleeding and aperients are the principal remedies; but in milder cases, where there is little or no febrile action, aperients alone may be trusted; or, if the abstraction of blood be deemed advisable, a small quantity only need be taken. A good aperient medicine may consist of six drachms of Barbadoes aloes, six ounces of Epsom salts, two drachms of ginger, and a quart of thin gruel. Another, perhaps, generally speaking, to be preferred, may be made with eight ounces of Epsom salts, eight ounces of olive oil or linseed oil, and a quart of thin gruel.

RED WATER AND BLACK WATER.

This disease must not be confounded with acute inflammation of the kidneys, attended by hemorrhage, which tinges the water with blood. Red water is indeed so called from the colour of the urine, and we have stated that such is its colour in cases of retention of food in the maniplus and in wood-evil; but it is very doubtful whether the colour, in these diseases, is at all owing to the presence of blood. Mr. R. Thompson attributes it to the absorption of vitiated bile, which, passing into the blood, stains all the secretions; and this opinion is corroborated by the fact that, in red water at least, the liver is enlarged, inflamed, sometimes rotten, and the gall-bladder distended with thick dark bile. This is the view taken by most veterinary surgeons of the present day; and, as Mr. Spooner observes, it is "supported both by an analysis of the urine, and an examination of the viscera, in fatal cases."

As to the connection of red water with disorder of the maniplus, we have the express testimony of many experienced practitioners. Mr. Youatt says, "The maniplus is perfectly dry; baking could hardly add to the hardness; were it not for its weight, it might be kicked about as a foot-ball. The leaves of the maniplus cling to the food contained between them; the papillæ leave their evident indentations on the hardened mass; and that mass cannot be detached without considerable portions of the cuticle clinging to it. The fourth stomach is empty, and the lining membrane covered with brown mucus, exhibiting patches of inflammation underneath .... The kidney is of a yellowish brown colour, and sometimes a little enlarged; but there is rarely any inflammation or disease about it." He adds, that the lungs have a yellow tinge, and the fluid in the pericardium is yellow, the chyle in the lacteals yellow, the skin dark yellow, and also the conjunctiva of the eye. These are symptoms of jaundice.

Mr. White (late veterinary surgeon of the First Dragoons) states that, after a careful examination, he is of opinion that red water originates in weakness of the stomach, from feeding on bad hay during the winter. "In cows that have died of this disorder we almost always find an accumulation of the fibrous parts of hay in the third or foliated stomach, compressed into thin cakes and matted together. The cuticular coat of the leaves of the stomach generally separates with those cakes of matted fibres, and the muscular coat is found weakened and distended."

There is considerable variety in the symptoms of this malady. Sometimes the urine is but slightly altered, sometimes it is of a deep yellowish red; at other times brown and turbid, and even of a blackish tint. When the latter is the case, it is termed *black water*. We can easily conceive that, from the continued bilious irritation of the kidneys, their minute vessels may at length begin to pour out blood; but, granting this to be the case, we are not to attribute the seat of the disease to these great excretory organs—they are passive sufferers only; we might as well regard the yellowness of the conjunctiva as indicative of disease of the eye. We need not wonder that, from the same cause, there is often distressing strangury, nor that dysentery should precede obstinate constipation of the bowels.

Practitioners, though they mostly agree as to the chief organs affected during the progress of the disease called red water, differ in their opinion as to its exciting cause: each judges from his own experience. Some, for example, attribute it to the noxious herbage of low undrained swampy lands; and there is no doubt that in such situations it is often prevalent. Others consider that it is of most frequent occurrence in dry and hilly districts, where little grass and less water is to be obtained during a hot summer, and instance localities of this description where it rages like an epidemic: we believe that they also are correct. Peat and moss lands have been known to produce this disease. It will result from feeding on the budding leaves of copses in spring, and the decaying leaves in autumn; and at these two seasons of the year it is most especially prevalent. A diet of bad hay during the winter will cause it; so will a sudden change of pasturage. The disease often occurs in cows after calving, perhaps from a change of diet, or some mismanagement. Change of pasturage, from a stony or flinty soil to a heavy clay soil, has been known to cause it. It sometimes ravages a farm; while in the next, divided from the other only by hedgerows, it is unknown. Of two adjoining fields, one may be dangerous, the other safe; nay, a field safe during certain parts of the year may be dangerous during another. Atmospheric influences may also have their effect; for it sometimes appears as an epidemic of a malignant character. Whatever, in fact, affects the digestive organs, including the liver, may give rise to attacks of this often fatal malady.

As we have already said, red water must be distinguished from inflammation of the kidneys, which is often combined with enteritis. True red water commences with dulness, languor, and loss of appetite; rumination ceases; the urine is at first brownish, and then of brownish yellow, and ultimately appears like dark porter: sometimes there is great strangury, but this is not an invariable symptom. The skin is of a dirty yellow; the eyes and nostrils are suffused with yellow, as is also the little milk that the cow may yield: its taste and odour are unpleasant. If blood be drawn, the serum, which separates from the coagulum, is of a brownish yellow. The pulse is quick; the animal can scarcely be forced to move; the loins are tender, and show signs of weakness; the ears and limbs become cold. At first diarrhœa makes it appearance, but only at first; but this suddenly stops, and is succeeded by obstinate constipation. The urine now becomes even still darker; the disease may be termed black water; the animal now rapidly sinks and dies.

The duration of this disease, from its commencement to its fatal termination, varies according to circumstances: it may continue for weeks.

It is rarely, excepting in the early stage of the disease, that the red water is curable. If the animal be robust, and the slightest febrile action present, moderate bleeding will be beneficial, but the flow of blood should be stopped as soon as the pulse is in the least degree faltering. Some practitioners dislike the abstraction of blood in this malady, but we can see no danger if caution be used; and both Mr. Simonds of Twickenham, and Mr. Harrison of Ormskirk, who have had extensive experience in its treatment, resort, unless there be good reason for the contrary, to this mode of treatment. The next step is the administration of purgatives and injections. The purgative draughts should be gently poured down the gullet, or slowly thrown down by means of the patent stomach-pump; a good aperient drench may consist of twelve or fourteen ounces of Epsom salts, four ounces of sulphur, half an ounce of carbonate of ammonia, and half an ounce of ginger, in thin gruel or warm water.

After the first drench, smaller doses should succeed at intervals of six or eight hours, with a repetition of the injections, until the bowels act freely. Mr. Harrison states, that he has seen a scruple of calomel, given in a pint of yeast, produce purging when other remedies have failed, the life of the animal being thus saved when there was little hope.

After the bowels have been well purged, tonics and diuretics may be given; as a drachm of ginger, a drachm of gentian (in powder), and an ounce of spirit of nitrous ether in a little gruel twice a day.

As the animal improves the skin will become clear, the breathing easy, and appetite will return: still the urine, from previous irritation of the kidneys, may continue dark-coloured or black. Under these circumstances, a few doses of oil of turpentine and laudanum (of each one ounce) in linseed-tea may be given with advantage. Great attention must be paid to the diet, which should consist of mashes, gruel, linseed-tea, and fresh vetches or meadow-grass, but never in large quantities at a time.

CONCRETIONS IN THE STOMACH AND MECHANICAL OBSTRUCTIONS OF THE ALIMENTARY CANAL.

Cattle are very apt, urged by some morbid condition of the stomach, to swallow various strange articles, as linen, leather, pieces of iron, &c., and such, for example, as handkerchiefs and other parts of dress, shoes, gloves, scissors, pieces of wood, bits of coal, and the like. Numerous instances of this nature are on record, and many farmers, no doubt, could supply others from their own personal experience.

Occasionally no mischief appears to result from this unnatural act, but generally the presence of these matters in the rumen produces irritation; the due performance of rumination is interrupted, the animal is dull, aperients have no beneficial effect, it becomes worse, and at last dies; when the stomach being opened, the cause of the mischief is discovered. Scissors and other sharp instruments will sometimes work their way through the coats of the rumen, and protrude between two of the ribs; frequently they pierce the pericardium and cause death. Large substances interfering with the action of the rumen, while the animal still continues to feed, conduce to the distention of that viscus, and occasionally, on the performance of the operation of opening that sac, the source of the evil is detected and removed.

It very often happens that bits of stick, iron, or stone, taken into the stomach, form the nucleus of a large globular calculus, consisting of the various compounds of lime or silex, beautifully arranged in concentric layers. These concretions are extremely firm and hard, and when sawn into two pieces, the flat surface of each takes as glossy a polish as marble. They vary in size; we have seen specimens of extraordinary magnitude. It is in the rumen principally, if not exclusively, that these calculi of the stomach are found, and their presence is often unsuspected until after death. Yet we cannot suppose that they produce no derangement of the digestive organs, and we believe that they are most commonly to be met with in beasts that do not thrive well, and that manifest irregularity of appetite. Whether they cause this, or are themselves the results of some morbid action continuing to exert an unfavourable influence, may be a matter of opinion; but of one thing we may be sure, they will not tend to the abatement of the morbid condition of the stomach which conduced to their formation: the rule of action and reaction may be reasonably suspected.

Cattle are prone to lick their own hides and the hides of each other. The hair swallowed passes into the stomach and becomes matted, by means of the saliva and mucus, into balls; a nail, a bit of stick, or a portion of fibrous vegetable matter, sometimes, but not always, constituting their nucleus. These bird's-nest-like balls are found both in the rumen and the abomasum. In the former, they are often mingled with vegetable matters, with threads of cotton, linen, or woollen, with particles of earth, straw, and other substances. In the abomasum, they consist exclusively of intertwined matted hair. How long these balls may remain in the abomasum, and what functional derangements they may occasion, it is not easy to say. Sometimes, however, these balls either pass into the intestinal canal, or are formed there, producing a fatal obstruction. The farmer drenches the poor beast, but to no purpose; not perhaps that the medicine fails in its office, but a mechanical obstruction prevents its due operation; this only adds to the animal's agony, and it dies worn out by pain, and perhaps inflammation. Could the nature of the obstruction be ascertained, some measures perhaps might be resorted to; and even when circumstances lead to a suspicion of the real state of the case, though it be suspicion only, no harm can be done by acting as if it were confirmed. Injections to a large extent of soap-water and oil should be administered, and that repeatedly, and a pint of linseed oil, with twenty grains of the farina of croton seed, or twenty drops of good croton oil, may be poured slowly down the gullet; this purgative, with a little gruel, may be repeated every eight or ten hours, till the obstruction be forced. Should pain and fever render it desirable, blood must be taken away, and it may be necessary to repeat the bleeding.

Balls of hair, however, are not the only mechanical obstructions of the alimentary canal. Balls of hard undigested fibrous vegetable matters, sometimes mingled with hair, threads, and extraneous articles, but by no means always so, are often impacted in the lower bowels: medicines give no relief, and the animal sinks after enduring indescribable agony. The same treatment must be pursued as that already described, and not unfrequently the hand, if the substance be in the rectum, will better remove the obstacle than any medicine. This observation applies both to hair-balls and to hardened fæcal matter. Horses are very subject to this obstruction, and it occurs frequently in cattle fed too much upon dry food. Some recommend in these cases, besides purgative medicines, injections of tobacco-water (an ounce of tobacco infused in a gallon of boiling-water), but in the use of this injection great caution is requisite. We have known it prostrate the nervous system even to dissolution. It may be tried as an ultimate resource. We are inclined to recommend injections of oil, gruel, and laudanum (of the last two ounces), in cases where the straining produces agony; the opium may not only ease the pain, but cause the muscular fibres of the lower bowels to relax from their constriction, while it will not interfere with the operation of the purgative medicines.

ENLARGEMENT OF THE MESENTERIC GLANDS.

We have said that, in the mesentery, to which the bowels are attached, there are numerous glandular bodies through which the lacteals, or nutrient ducts, pass in their course to the thoracic duct, or great receptacle of the chyle. In the ox, as in the human subject and other animals, these glands are liable to enlargement; they are affected with a scrofulous disease, and in this condition arrest the currents of nutrition; the abdomen swells greatly, the limbs and frame become emaciated, the eyes sunken, the membranes of the nose and mouth pallid, the respiration hurried, the pulse quick, and the prostration of strength extreme; there is often an unpleasant cough and other symptoms of consumption, which increase till the animal dies, almost a skeleton. Sometimes tumours can be felt by passing the hand over the surface of the abdomen, but this is not always the case.

In such a disease little or nothing can be done. Doses of mercury and opium, as two scruples of calomel and half a drachm of powdered opium given every evening, with tonic draughts (gentian, or infusion of cascarilla) during the day, may perhaps mitigate the symptoms. To these remedies occasional aperients may be added. Eight or ten grains of iodide of potass, divided into two doses, may be given daily in gruel, the quantity of the iodide being gradually increased to ten grains for each dose. If this be used, the mercury and opium must be omitted. Warm stabling and good food are of course essential. After all, little, we repeat it, can be done; the disease has generally made great progress before it is suspected, and it runs its course. Frequently it is associated with a tuberculous state of the lungs, and also with enlargements of the glands generally.

Though mature cattle are not exempt from this malady, it occurs most commonly in young weakly beasts, poorly fed, and reared in low damp situations. Let it be remembered that, as in consumption, the tendency to it is hereditary. It is, in fact, a form of consumption, the index of a scrofulous diathesis.

POISONS.

Cattle sometimes partake of poisonous plants, as the water-hemlock, the yew, and others, and perish in consequence; nor is it easy to determine from the symptoms alone that they are suffering from such a cause. The animal is torpid, and swells; its thirst is excessive, but it refuses food; it grinds its teeth, evidently from agony—stamps, paws the ground, strikes at its flanks, and sometimes rolls on the ground, as if labouring under spasmodic pains and colic.

Occasionally the animal becomes infuriated, as if agitated by frenzy; this state of madness continues for a longer or shorter period, ending in general palsy, torpor, and death.

Examination of the body in these cases reveals inflammation of the paunch and reticulated stomach; and often also of the abomasum and small intestines; while the maniplus is filled with hardened vegetable matter. The cuticular coat peels readily from off the muscular coat of the rumen and reticulum or honeycomb—the sign of commencing disorganization; and the abomasum is not unfrequently ulcerated.

If it be ascertained that an animal has fed on noxious plants, instant recourse must be had to the stomach-pump; the stomach must be deluged with water until the rumen overflows, and the contents are rejected by vomiting. Nor will one operation of the kind be sufficient, it must be repeated; and afterwards smart aperients, consisting of salts, oil, and gruel, must be slowly poured or injected down the œsophagus, and repeated every six or eight hours until the bowels are well purged.

Supposing that there be a mere suspicion that poison of this kind (known to be accessible) has been taken, but that in reality the symptoms arise from some distension of the rumen only, attended by severe colic, still no harm will be done. The rumen will be relieved, and the bowels emptied of irritating matter; and a cordial, with a little opium, will complete the cure.

With respect to mineral poisons, it is not often that they are accidentally swallowed by cattle. Arsenic may, indeed, be given wilfully, and perhaps a piece of bread-and-butter, sprinkled with arsenic for the destruction of rats, may be left carelessly in the way of cows, and devoured; but these are rare cases. No one can tell the cause of the horrible suffering endured by the poor animals; they die, and perhaps after death the presence of poison is detected in the stomach. Let us, however, suppose it to be known that arsenic has been swallowed—what is to be done? A quantity of lime-water or of chalk and water must be injected into the stomach, and, after remaining a few minutes, pumped out, a fresh quantity being injected. This may be repeated two or three times, and at last a fresh quantity injected and left, in order to neutralize the arsenic, if any remain in the stomach. Aperients of salts and oil must then be given, and their operation assisted by clysters of oil, salt, and gruel.

Corrosive sublimate (bichloride of mercury, or oxymuriate of mercury), though never given internally to cattle, is often rashly used by ignorant persons as an external application to ulcers, mangy spots, and other cutaneous affections. It is a most dangerous remedy; for it will pass into the system by absorption, and produce serious illness, or even death. The animals become dull, they cease to ruminate; frothy saliva drops copiously from the mouth; they moan, and move restlessly, strike at their flanks, and are tormented with violent and often bloody purging. After death, traces of active inflammation appear in the intestines, and in the rumen, honeycomb, and abomasum. In this case, the remedy will consist of the white of a number of eggs beaten up, and mixed with a little gruel: this mixture must be gently poured down the gullet, and repeated every hour till the symptoms abate; aperients may afterwards be administered, and copious injections of gruel. Too often, however, all remedies prove useless; frequently there is no time to have recourse to them.

We may now pass on to a consideration of some of the more local and external diseases, or injuries to which cattle are subject, the treatment of which, by the ignorant cow-leech, often produces irreparable mischief.

There are two diseases to which the horse is subject, but, as there is reason to believe, not the cow: we mean glanders and farcy: at least, no well-authenticated cases are on record. One of the symptoms of farcy in the horse, is inflammation and thickening of the absorbents, especially at the valves; the absorbents have a corded feel, and at greater or less distances along their course, where the valves are situated, small tumours or buttons arise, arresting the current of the fluid contained. Farcy is a highly contagious disease, and often accompanies glanders; but though true contagious farcy either does not occur, or very rarely occurs, in the ox, inflammation of the absorbents is not uncommon.

INFLAMMATION OF THE ABSORBENT VESSELS OF THE SKIN.

As in farcy the absorbents are corded and show buttons at the valves along their course, these buttons become hard and scirrhous, and some suppurate, and degenerate into ulcers. This disease may be more or less extensive, and may result from various causes, as from wounds rendered foul and irritable by improper dressings, from diseased hoofs, or ulcers of some of the joints of the limbs. The absorbents running from these wounds or ulcers become irritated and inflamed, and the whole system sympathizes. As soon as the ulcers heal, the active inflammation of the absorbents subsides, though a thickening or cording of their tissue may remain for a considerable period. During the stage of inflammation the buttons often burst, and ulcerate, producing considerable mischief. They are extremely difficult to heal, but still there is no danger of contagion.

Mr. Youatt describes the cases of four oxen, which at different times, respectively, during the course of three years, were seized with what the farmer to whom they belonged considered as farcy—cording of the absorbents, with farcy buds or buttons extended up the limbs from the fetlock to the fore-arm; some of the buds were scirrhous, others in a state of ulceration. In each instance the animal laboured at the time under a severe cough. Simple treatment, and the application of the hot iron to the buttons, effected restoration to health; the wounds healed, and the thickening of the absorbents subsided, the cough at the same time disappearing.

In two months afterwards, the cough and thickening of the absorbents returned, and the same means were again resorted to with the same success.

Although these were believed to be cases of farcy, and they certainly bore a close resemblance to that disease, yet Mr. Youatt is decidedly of opinion that it was in resemblance only that the agreement consisted, and that when such cases occur the farmer need not entertain serious apprehension of the baleful disease known as farcy breaking out in his herd.

DISEASES OF THE EYE AND EYELIDS.

The eye of the ox is very subject to injury from blows, from thrusts with the prong of the stable-fork, and from the horns of other cattle; sometimes the eye itself is destroyed, sometimes bony tumours or excrescences are formed on the ring of the orbit, and sometimes the superciliary ridge of the orbit is fractured. In these cases little can be done, but they ought never to have occurred. When the superciliary ridge is fractured, the fractured portion must be readjusted as well as possible, and secured by a bandage, and bleeding and purgatives resorted to in order to allay fever and inflammation. Bony excrescences may be sometimes removed by means of a fine saw, the root being afterwards slightly touched by the cautery. In other cases their growth may be checked and exfoliation produced by the application of the cautery, at a low temperature, but a fine saw or chisel is always preferable. These excrescences not unfrequently degenerate into a state of caries. The animal should be destroyed, and the sooner the better.

Ophthalmia often arises in cattle from injury to the eye, or from the presence of irritating substances lodged beneath the eyelids. Sometimes it proceeds from constitutional causes alone, and returns periodically: indeed, this form of ophthalmia is hereditary, like consumption, and a radical cure is almost hopeless. Ophthalmia arising from irritating substances, or from blows, generally yields to bleeding, to purgatives and fomentations, or the goulard lotion (composed of the liq. plumbi super-acetatis and water), with a little laudanum; when the active inflammation is subdued, a lotion of the sulphate of zinc (white vitriol) may be used with advantage. Periodical ophthalmia, though relieved for a time, usually terminates in blindness; it might perhaps be treated with good effect by small doses of calomel and opium, repeated daily for a short time, and by mercurial lotions; but when the character of the disease is ascertained, the farmer prefers preparing the beast for the slaughter-house; and probably this is his best course.

Severe inflammation of the eyes, with eruptions about the mouth, and swellings of the tongue and throat, often occur in young cattle fed on wet pasture-lands, especially if much wooded. Sometimes superficial ulcerations of the cornea make their appearance, and if the case be rashly treated, blindness will ensue. It may be as well under these circumstances to take away a little blood; gentle purgatives must be administered, and the eyes fomented with warm water or a decoction of poppy-head; some prefer cold evaporating lotions, as cold water with a little spirit, the goulard lotion, and afterwards a weak wash of sulphate of zinc. Change of locality is essential, and while the disease continues, the animal should be housed.

Cataract and amaurosis, or gutta serena, are not unknown among cattle; the latter, however, is very rare. In the aqueous chamber of the eye of the horse a small hair-like parasitic worm, nearly an inch in length, has been occasionally discovered; and we believe that in the eyes of horned cattle a similar parasite has been known to occur, accompanied by the ordinary symptoms of ophthalmia.

The eyelids of cattle are frequently affected with diseases, independent of the inflammation which extends to them in cases of ophthalmia; the edges, along which the sebaceous glands open, are sometimes subject to a pustular eruption and ulceration; in these cases the skin is often mangy, and the animals are in wretched condition. Aperients of sulphur, and alteratives, consisting of one drachm of æthiops mineral (sulphate of mercury), two drachms of nitre, and four of sulphur, given every night, will be found useful; the eyelids must be smeared with the ointment of nitrate of mercury (ung. hydrargyri nitratis, P.L.), more or less diluted with pure spermaceti ointment, or pure olive oil, every night and morning, by means of a camel-hair pencil (no iron must come in contact with the preparation). The ointment of the nitric-oxide of mercury (ung. hydr. nitric-oxyd. P.L.) diluted in a similar way is also valuable. This is essentially the golden ointment, so much in vogue.

Warts occasionally form on the eyelids and prove troublesome: these may be removed by means of a pair of sharp scissors, the places being afterwards touched with lunar caustic. In weakly or aged cattle, ill fed and out of condition, an œdematous or dropsical swelling of the eyelids not unfrequently occurs, the cellular tissue being puffed up with serum infiltrated into it, the tumefaction *pits*, upon pressure, like dough. A restoration to good health and strength is the only remedy.

In high-fed and fattening oxen, on the contrary, the eyelids are found to be puffed up by some gas, which distends the cellular tissue: a slight scratch with the point of a lancet will allow of the escape of the gas, upon pressure; but it is better to let the eyelids alone, and give a dose of physic.

The haw, or membrana nictitans, of the eyes, is sometimes found to be swelled, inflamed, and even ulcerated from irritation; and is not unfrequently enlarged and protruded in consequence. Cooling mashes, as goulard lotion, with a little laudanum, will diminish the inflammation, and afterwards the astringent solution of sulphate of zinc (from two to four grains to an ounce of pure water), must be applied two or three times a day, to the part itself, a camel-hair pencil being used for the purpose. This treatment, if persevered in, will often effect a cure. Where fungous excrescences sprout, they may be delicately touched by the caustic. The haw should never be removed if possible; this movable curtain cleanses and defends the surface of the eye, and its loss is a serious inconvenience. In some cases, however, the veterinary surgeon may advise its excision, and to him alone must the operation be intrusted.

FOUL IN THE FOOT, LOO, OR LOW.

The foot of the ox is extremely vascular; the bones of the toes are perforated by numerous veins and arteries; the veins are larger and more tortuous than in the horse, and are very conspicuous on the pastern. It is from this vascularity that sprains of the foot, to which, from its bifid character, it is peculiarly liable, are so often followed in the ox by serious consequences, or that accidental wounds produce so much inflammation. Scarcely a drove of cattle passes along the road among which several of the oxen are not lame; and it is on the feet that the brutal drover ever and anon strikes them to hurry them along, haply to their slaughter. Often have we traced the course of a herd of oxen by the blood-stains on the road. The feet are not only strained, the joints swelled and inflamed, but the hoof is worn to the quick or wounded by sharp flints, or thorns, or pieces of fractured glass. Rest, fomentations, and dressings of tar ointment for the hoof, will generally effect a restoration; but if the lameness be severe, bleeding from the veins of the coronet, and that to a considerable extent, is absolutely requisite; for in the joints of the toes inflammation sometimes induces anchylosis. The veins may be opened by a sharp scalpel or drawing-knife, by a lancet, or a small fleam. Severe wounds of the toes, after being well washed, may be dressed with Friar's balsam on a pledget of lint, rag, or soft tow, bound on by stout rollers or bandages.

Thorns, nails, pieces of glass, &c., remaining unnoticed in the foot, between the toes, or on the sole, often produce unpleasant abscesses; and inflammation of the parts within the hoof, from over-driving on hard roads, will occasionally end in the same result, especially if the horn be worn to the quick. When oxen are pricked by a nail in bad shoeing (we allude to working oxen), as is so frequently the case in horses, abscesses and sinuses will form; these are termed quittors in the horse, and are not easily managed,

When a travelled beast continues lame after rest sufficient for the restoration of footsore cattle, or when a beast begins to limp, the lameness rapidly increasing, let it be secured and the foot carefully examined. Suppose a nail or similar substance be found driven into the sole, or any part of the hoof, common sense will direct its extraction, and its extraction will be probably followed by a flow of purulent matter. Suppose there be a punctured wound only, with inflammation and an abscess more or less deeply seated: in both cases the hoof around the spot must be neatly and cautiously pared down, and, as far as it has separated from the parts beneath, removed; let the abscess be opened, and the purulent matter have a free exit. A poultice of linseed meal may be then applied, and changed twice a day; and in a few days, if all go on well, and healthy healing take place, a little butyr of antimony sprinkled over the denuded part every day will induce a new secretion of horn, while a simple bandage, or a pledget of soft tow, bound over the whole, will be a sufficient dressing. If fungous granulations appear, they may be levelled with a sharp pair of scissors or a knife, and touched with caustic.

If on examination of the foot of a lame animal no wound appears, it will be necessary to try the hoof in every part by a pair of pincers, and when the pressure gives pain, indicated by the flinching or shrinking of the animal, let the horn be there shaved away and the abscess laid open.

Perhaps, however, suppuration has not commenced, but the inflammation is strong and active: under such circumstances, the foot must be well fomented, and afterwards enveloped in a large linseed-meal poultice; this will soften the horny hoof, and promote the suppuration, while at the same time it relieves the pain and inflammation. In due time the abscess shows itself on the coronet, and must be opened by a lancet; the direction of the sinus should be ascertained by a probe, and the horn shaved away along its course so as to lay it open; should there be several sinuses, the same plan must be resorted to with each. Poultices must now be renewed until healthy granulations appear, and every particle of loose or unsound horn must be removed; butyr of antimony may now be lightly applied, or the wound may be dressed with Friar's balsam on lint; this must be renewed every day, and a bandage wrapped firmly and evenly round the hoof.

Cattle, especially such as are fattening upon stimulating food, are subject to inflammation, cracks, soreness, fungous excrescences, and a fetid discharge between the toes. If the disease be neglected, the inflammation extends; in a few days abscesses form and burst, and others, succeed until the foot becomes completely disorganized: the animal in the mean time wears away, and becomes a miserable object; the toes are now thrown far apart, the bones become carious, sinuses extend in all directions, and purulent matter is profusely discharged. In this state the animal may linger for several months, until it dies worn out by pain and exhaustion.

A common but brutal remedy in these cases is to rub a tarred rope or horse-hair line to and fro between the hoofs, in order to remove the excrescences and stimulate the surface to secrete healthy horn; dressings of stimulant applications are afterwards applied.

If the inflammation be high, bleeding from the veins of the coronet and aperients are necessary. A linseed-meal poultice may then be used, and renewed twice a day until suppuration has taken place, and the sloughing ulcers assume a healthy appearance. A little turpentine may be added to the poultices. Fungous granulations must be touched with the caustic, or sprinkled over with verdigris or sugar of lead. In cases where there is a foul fetid discharge, a lotion of a solution of chloride of lime will prove serviceable. When the ulcers are healthy, they may be dressed with tincture of myrrh, or Friar's balsam. Stall-fed cattle should be turned to grass.

Some practitioners recommend the application of the following ointment as soon as the ulcers are cleared by the poultice: viz. hog's-lard and turpentine, of each four ounces; melt together over the fire, and as soon as removed from the fire, stir in one ounce of blue vitriol very finely powdered, and continue stirring till the ointment is cold.

DISEASES OF THE SKIN.

Cattle kept in wretched hovels or cow-houses, or badly fed on unwholesome food during the winter, are liable to mange. It is said that too luxurious a diet will produce it, but we have never known it result from such a cause: often, however, from neglect of cleanliness, and a scanty pittance of innutritious food. It commences with a violent itching: the tormented animal rubs itself against posts, palings, gates, or the boles of trees; the hair about the neck, shoulders, and sides, is soon worn off, and the skin is red, thickened, and rises in long ridges or creased folds. The cow becomes dull, feeds little, loses flesh, and fails in her milk. In some places a thick scurf appears, in others sores or scabs, from frequent and violent rubbings. Occasionally the surface of the skin becomes covered with scabs, which peel off, and are succeeded by foul ulcers. In the mean time the animal is infested with lice; they abound in myriads, tormenting the miserable creature, and combine with the disease of the skin to render it an object of disgust and apprehension. Not only are these parasites communicated to healthy cattle in the same field, but the disease of the skin also; the slightest contact, or the circumstance of lying on the same spot, is sufficient to cause the communication either of the mange or of the lice, or of both.

Cattle infected with the mange should be kept strictly apart from all others; the first thing to be done is to render the skin as free from scurf, loose hairs, and dirt, as possible; this may be done by means of a wisp of straw, or the curry-comb: then let a strong sulphur ointment be well rubbed in with a hard brush.

The following ointment generally succeeds:—

Flowers of sulphur, one pound; turpentine, four ounces; strong mercurial ointment, two ounces; and linseed oil, a pint. Warm the oil, and mix the turpentine and sulphur with it, incorporating the whole well together; afterwards add the mercurial ointment, by rubbing the whole together in a large mortar, or by means of a stout spatula on a slab.

This ointment must be carefully applied to every part, and will soon begin to take effect. In the mean time, it will be well to give internally six or eight ounces of sulphur, with a drachm, or even two, of æthiops mineral, every third day.

Some persons employ tobacco-water as a lotion in this disease, but this is a dangerous remedy; it causes trembling, sweating, utter prostration of strength, and sometimes even death. Others use a strong solution of corrosive sublimate, a still more dangerous application, and one which has caused the death of cattle in numerous instances. We have alluded to its effects when noticing *poison*. If this deadly poison is deemed requisite in very inveterate cases (and it is better in these cases to effect a *gradual* than a *rapid* cure), the following prescription is recommended:—

℞	Hydrarg. per-chlorid.	ʒ ij.
	Acid. Muriatic.	℥ ss.
	Aquæ distillat.	℥ xvj.—M.

We purposely write the above prescription in this manner, in order that it may be made up by no one (the veterinary surgeon excepted) but a respectable chemist. Before using it the animal must be well washed with soap and water, by means of a hard brush; the lotion may then be applied in small quantities, and not at once, over an extensive surface, lest mischief occur. We cannot, however, conclude, without strongly advising the farmer to have nothing to do with it himself, nor to allow it to be applied by the cow-leech. The veterinary surgeon will avail himself of it only when all other means have failed, and, knowing the danger, will act with due caution.

When cattle are infested with lice alone, these may be destroyed by an ointment consisting of four or five ounces of sulphur, four ounces of turpentine, and twelve ounces of linseed oil. It is said that the powder of stavesacre, mixed with lard and train oil, will kill these parasites. It is generally believed that the mange in cattle, like the scab in sheep, and the itch in the human subject, is immediately caused by the presence of numbers of a peculiar species of mite (*acarus*), which produce minute pustules in the skin, within which they live and multiply, and thus extend the disease from one part to another: they are tiny skin-burrowers, tormenting the animal, and feeding on the serum or water within the pustules, caused by their irritating presence. Though this is true with respect to the human subject and the sheep, we do not know whether these minute parasites have been demonstrated in the skin of horned cattle.

WARBLES.

Warbles are tumours on the skin of cattle, produced by the presence of the larvæ or maggots of a species of gad-fly, or breeze (*Œstrus Bovis, Clark: Hypoderma Bovis, Latr.*), a dipterous insect, notorious in ancient as well as in modern days, and which the Romans, as Virgil states, termed *asilus;* the Greeks, *œstrus.*

Farmers are mostly careless about warbles; but these suppurating tumours render the hide of the beast less valuable to the tanner; so that, if for no other reason, the larvæ should be destroyed: the best way is by crushing them, and pressing them out with the finger. It is some time after the destruction and expulsion of the larva that the cell is filled up; even then a weakness and a disposition to crack remain for a long period.

WOUNDS, BRUISES, STRAINS, ETC.

Cattle are subject to wounds from various sources. They often stab each other with their horns; they sometimes run against sharp hedge-stakes, or the points of sharp agricultural implements, and similar articles. These wounds are sometimes very deep, and the cow-leech aggravates the mischief by irritating applications: he applies the same to trifling wounds, and converts an accident of little consequence into an affair of some magnitude.

When an animal has received a deep and formidable wound, as in the chest, the shoulder, the neck, or side, but yet no vital organ is injured, the first thing to be done is to prevent high fever and inflammation. Blood must be abstracted, and saline aperients administered; then let the wounded part be well fomented with a decoction of poppy-heads, next covered with soft lint, and a large linseed-meal poultice placed over it. These must be repeated till the inflammation be subdued, and the wound begins to discharge healthy purulent matter—the sign of the commencement of granulations. It is requisite that the wound should heal up from the bottom, and that the matter should have a free vent; it will be now therefore necessary to introduce a tent or plug of soft tow, of sufficient size smeared with a digestive ointment, which may consist of lard and turpentine, of each four ounces. Melt these together, and add an ounce of verdigris (acetate of copper). This will keep down the granulations at the sides and upper part of the wound, while they are filling up the bottom. It is sometimes necessary to enlarge the external orifice of the wound to allow of the escape of matter; for if this be confined it will lead to extensive suppurating sinuses, and other mischief.

It often happens that wounds bleed freely, some large vessel being injured. This generally is not attended with danger; but if the flow of blood continue longer than is deemed prudent (for it will relieve the animal), it may be stopped by firm pressure adapted to the situation of the wound. In managing this some judgment is requisite; for it is not always easy to secure the compress. The bleeding having ceased, the treatment already described must be pursued.

If the sides of the chest of a beast be punctured, but as far as can be told the lungs have escaped uninjured (for should they be lacerated there will be little or no hope), the wound must be closed, and kept closed by stout adhesive plaster, and the treatment recommended in pleuritis adopted. Bleeding, aperients, and doses of nitre combined with digitalis and tartarised antimony, are the chief medicines. The wound must be looked at in a day or two, and healed by tents, as described, from its deepest part; if it discharges matter, this must have vent externally. We need not say that the case is pregnant with danger.

It not unfrequently happens that the abdomen is wounded, and that some of the bowels protrude. These should be first cleaned from dirt with warm water, and then be gently and cautiously returned, even if it be necessary to enlarge the wound for the purpose, and to throw and secure the beast with cords. The edges of the wound must then be brought together, and secured with stitches of thread, in the skin only, or with metallic sutures, which are better and not liable to give way. A bandage should be neatly and closely applied, its folds being brought round the body, and prevented from slipping. The medicinal treatment will consist of bleeding, aperients, &c., according to the symptoms which supervene.

In all these cases the aid of a veterinary surgeon is quite indispensable. His anatomical knowledge will be called in requisition, and the farmer must rely on his judgment. Nerves, tendons, and ligaments are often lacerated by wounds; and injuries or fractures of bones may occur. The peculiar line of treatment to be pursued in each case (and no two cases will be precisely alike) must be directed by the experienced practitioner.

When cattle meet with severe strains or bruises, it will be often necessary to take away blood and administer aperients. The injured parts must be well fomented, and afterwards covered with a poultice, if the situation of the part will admit of it. When the inflammation has subsided, but swelling and stiffness remain, a stimulating embrocation of oil, hartshorn, and turpentine, will be very useful.

It often happens that severe strains produce inflammation of the fetlock or the pastern-joints, accompanied by swelling, heat, and great tenderness. Bleeding from the veins of the coronet, poultices, rest, and afterwards embrocations, constitute the plan of treatment: blisters, should the stiffness not subside, will be needful. Too frequently these strains of the feet are neglected, and result in permanent lameness: callus, or a bony deposit, is formed around the joints, producing a ring-like exostosis, and the beast is crippled, and hobbles along, suffering great pain at every step. In these cases, neurotomy—that is, dividing, or rather cutting away, a small portion of the sentient nerve which supplies these parts—is recommended by Mr. Youatt; indeed, he was the first to propose it, and his plan has been found successful. This operation can be performed only by the veterinary surgeon.

GESTATION AND PARTURITION.

The natural period of gestation is generally stated as two hundred and seventy days, or nine calendar months, but there is considerable variation in this respect; according to the experience of some breeders, the average is two hundred and eighty-four, or two hundred and eighty-five days; sometimes the period is still longer, and under these circumstances the offspring mostly prove to be bull-calves. The pregnancy of a cow may be determined by a practised ear, or by means of the stethoscope, in as early a stage of it as six or eight weeks. If the ear or instrument be applied to the right flank, beginning on the superior part of it, and shifted backwards and downwards, the pulsation of the head of the fœtal calf will soon be heard, twice as frequent at least as that of the parent; each pulsation will betray the double beating of the fœtal heart, and the rushing of blood through the vessels of the placenta will at the same time be audible.

The cow has now to nourish the fœtus; still for some months, if in good condition and not half-starved, little difference will be perceived in the quantity of milk yielded. At length the decline of milk is palpable, and for a month or three weeks at least before the anticipated time of calving, she should be allowed to dry. Cows in poor condition should be dried at least two months before calving, otherwise from deficiency of nutriment the calf will be stunted, weakly, and, even if it live, of little worth. Too high and luxurious feeding must on the other hand be avoided, for fever and inflammation are then apt to follow parturition.

Besides the reasons for drying the cow before calving to which we have alluded, another is, that if the animal be milked too long, so that on calving the new milk descends into the udder, while the flow of the old milk continues, there is imminent danger either of puerperal fever, or of inflammation of the udder. Experience has abundantly proved that on these grounds alone, the cow (though yielding a tolerable supply), should be dried before the secretion of new milk for the expected young one commences.

Other precautions must be taken with regard to cows in the latter months of gestation, and especially as the time approaches. The bowels must be kept in a relaxed condition, and the food should be limited in quantity; at all times the rumen, when loaded, presses upon the uterus, but more especially so during gestation, and should the rumen become distended with food or gas, or the maniplus become filled with hardened and matted vegetable fibres, arresting the due and healthy process of digestion, the pressure of the enormous rumen may conduce to the destruction of both parent and offspring. It sometimes occasions an alteration in the position of the fœtus, it always renders parturition difficult, and fatal cases oftener, perhaps, arise from this than from any other cause. Farmers in general seem to be little aware of the necessity of regulating and moderating the diet of cows on the eve of parturition, yet there are few who have not lost cows from this neglect. The food allowed, moreover, must not be stimulating; the system takes on at this time a febrile excitement; hence, in cows which have been high fed in rich pastures, or on much dry food, it will be well to have recourse both to a mild dose of aperient medicine and the lancet, blood being taken in moderation according to the strength of the subject.

It is the absurd and cruel practice of some, when they observe the precursor signs of parturition, or even when the latter has commenced, to rouse the cow and drive it about; hoping, we suppose, thereby to hasten the process which

Nature herself has undertaken to regulate, implanting in the beasts instincts obedient to her law. The consequence of this ignorant, brutal practice is inflammation and all its train of evils, and not unfrequently death. What does instinct teach the animal?—to leave the rest of her companions, to retire to some quiet spot, to the shelter of the hedge, or the side of a coppice, in order that she may escape disturbance till she has brought forth her young. The wild cattle, when they calve, select some sequestered situation, amidst the dense thickets of the wood; there they hide their progeny, and go several times every day to suckle it, remaining near it at night. The domestic cow has lost her original shyness, but still she seeks an undisturbed spot and quits the herd.

If her pasture afford no shelter, the cow should be put into some quiet retreat, and be housed in severe or stormy weather.

The precursor signs of parturition are too well known to be minutely detailed; restlessness, moaning, a visible and rapid enlargement of the udder, accelerated respiration, and a dropping of the abdomen, first attract notice. Soon the restlessness increases, the animal keeps getting up and lying down; at last she remains lying on the ground, and if all go on well, is soon delivered of her offspring.

In all cases of difficulty, the aid of the veterinary surgeon is imperatively demanded, and the after-treatment should be intrusted to his care, as puerperal fever and inflammation of the udder are not unfrequent sequels.

SORE TEATS.

Cows after calving, and especially young cows, are very subject to tenderness and soreness of the teats. They become inflamed, often excoriated, or covered with cracks, from which a sanious discharge oozes. Those who milk the cattle are often very careless both as to the dipping of this discharge into the milk, and to the pain which they inflict on the cow. In both points there is nothing to excuse them, nor can language too severe be applied to them. Many a good cow is spoiled by the milker. Under the pain inflicted the animal often kicks violently, and this will at last become habitual; she will retain her milk, and contract a habit of retaining it, by which its quantity will speedily become diminished. The cow requires soothing and gentle treatment; the teats before milking should be well cleaned, and fomented for some time with warm water, in order to ease and mollify them. No unnecessary violence in milking should be used, but at the same time the udder must be thoroughly drained, for it is seldom that the teats suffer without the udder in some degree participating in their tenderness; and a slight cause may aggravate this into positive inflammation. After milking, the teats may be dressed with a cooling and somewhat astringent ointment, composed of two drachms of sugar of lead, and a drachm of alum finely powdered, added to four ounces of spermaceti ointment.

COW-POX, OR VARIOLA.

It is to Dr. Jenner, of Berkeley, Gloucestershire (who died February 21, 1823, aged seventy-four), that we owe the practice of vaccination, as a preservative from the attack of that destructive scourge of the human race, the small-pox. The experiments of this philosophic man were begun in 1797, and published in 1798. He had observed that cows were subject to a certain infectious eruption of the teats, and that those persons who became affected by it, while milking the cattle, escaped the small-pox raging around them. This fact, known to farmers from time immemorial, led him to a course of experiments, the result of which all are acquainted with. Yet in one opinion, an opinion in which many medical men of the highest eminence have coincided, Dr. Jenner appears to have been wrong. He regarded the cow-pox not as an original disease of the cow itself, but as one communicated to that animal from the horse. He conceived that the sanious fluid of the disease of the heels, called grease, so common in horses, was the source of the pustular eruption in question. Cows, feeding in the same pasture with horses thus affected, might lie down on the spots where the sanious discharge from the grease had dripped, and in this manner the teats might become inoculated; or persons who had dressed or rubbed the heels of horses might, with unwashed hands, engage in milking the cows, and thus inoculate them. But query—will the matter of grease produce the cow-pox in man or animals? Will inoculation from the diseased heels of the horse produce in the human subject the true cow-pox pustule, and exemption from the small-pox? Inoculation with this matter may, indeed, produce a pustular disease, but not cow-pox. It may produce unpleasant sores, and convert simple cuts into festering wounds; these, however, in no respect bear any analogy to the vaccine disease. Various experiments have been made on the subject by Woodville, Simmons, Professor Coleman of the Veterinary College, Bartholini, Dr. Pearson, and others, which demonstrate the error of the theory; and though there may be some few medical men who yet retain the opinion, it has been abandoned by those who have closely investigated the subject. The two diseases, as the veterinary surgeon well knows, have nothing in common between them.

The cow is subject to two kinds of pustular eruption on the teats, both infectious, and usually comprehended under the same name; but of these, one only must be regarded as the genuine cow-pox. In the spurious disease the pustules are small and of irregular shape; in the genuine disease they are large and round, with a central depression, and accompanied by more or less of fever and general derangement. In both, however, they are filled with a limpid fluid, which by degrees becomes opaque and purulent. A scab is then formed, which in a short time peels off, leaving the skin sound beneath. If, however, the pustules are broken, they degenerate into ulcers—larger, deeper, and more difficult to heal in the genuine than in the spurious cow-pox. To distinguish between these two species of pustular eruption is important: the true disease may be known by the large size of the pustules, their depression, the decided ring of inflammation around them, and the constitutional disturbance of the animal. In both cases the treatment is simple; an aperient draught and a cooling lotion are all that is needed. If ulcers are produced they may be occasionally washed with a weak solution of chloride of lime, and powdered with a little calamine, or dressed with the calamine cerate of the London Pharmacopœia.

DISEASES AND TREATMENT OF CALVES.

From those diseases which more immediately concern the cow, we may now turn to those which peculiarly affect the calf, and, which, setting accidents aside, are nearly all more or less connected with a deranged state of the digestive organs. In the calf, as we have said, while feeding exclusively on its mother's milk, the first three stomachs are undeveloped, the abomasum or true digestive stomach alone being required; but as it begins to partake of vegetable food the first three stomachs gradually increase, and begin to labour in the performance of the duties now imposed upon them. In both states the powers of digestion are often overtaxed; for the calf is apt to take more than it can properly digest, especially if not allowed free exercise, or if the bowels have not been cleared of the black excrementitious matter (meconium) with which they were loaded after birth. Some farmers refuse the first milk or *beastings* to the calf, ignorant that it is a purgative expressly intended by Nature for this purpose; the consequence of which is, that, early as it is to begin with medicine, some aperient is rendered absolutely necessary, recourse to which might have been prevented had nature not been interfered with. The mischief, however, is done; and the only question to be settled is, what purgative must be chosen? Two or three ounces of castor oil, mixed up with the yolk of an egg into an emulsion, and a scruple of ginger, may be added to a little thick gruel to form a drench. This is a safe and generally an efficacious medicine; but no necessity for it ought to have existed.

Some farmers, again, anxious to render their calves fat for the butcher as expeditiously as they can, and forgetting both the natural weakness of the digestive powers and the small volume of the stomach (the first three being undeveloped), allow the calves either to suck *ad libitum*, or give them, if brought up at the pail—that is, by hand—a greater quantity of milk than can be digested. The idea of oppressing or overloading the stomach never enters into their minds. They imagine that the more food the young creature takes the more it will fatten; and they allow it no exercise lest it should "wear the flesh off its bones." The stomach soon becomes deranged; its functions are suspended; the milk, acted upon by the acid, coagulates, and forms a hardened mass of curd, which fills the abomasum even to distention. The muscles are now affected with spasms; they are violently cramped, and feel hard and knotted: this the farmer calls being affected with the *cords*. Flatulent colic next ensues, which often runs into inflammation and terminates fatally. Generally the bowels are obstinately confined; but this condition is sometimes preceded by diarrhœa. The quantity of hardened curd which is taken from the stomach after death is often enormous; and it is not unfrequently compressed into a mass resembling new cheese in appearance and solidity. We may easily form an idea of the agony which the poor little animal must have suffered; and we are sorry to say that numerous calves are subjected to it till released by death.

Prevention in these cases is easier than the cure: indeed, unless remedies be early applied all attempts are futile. What can break up and dissolve a mass of indurated curd, filling the stomach and oppressing all its powers? As we have said, early treatment alone can be expected to succeed. Some practitioners recommend the frequent administration of warm water, in which two ounces of Epsom salts are dissolved; this they direct to be given by the stomach-pump; or if by a horn, to be poured gently down the gullet. Others recommend drenches of lime-water, potass, salts, and gruel, with the design both of acting upon the bowels, and at the same time correcting the acidity of the stomach. The farmer should always keep a bottle of "solution of potass in lime-water" in readiness. Its preparation is directed as follows: Take a lump of quick-lime of the size of an egg, and pour on it in a convenient vessel as much water as will slake it. This being done, then pour upon it one pint of boiling water, stir the whole up, and cover close. While this is allowed to stand for some time, take an eight-ounce bottle, and put into it two ounces of subcarbonate of potass (salt of tartar), and fill up the bottle with the lime-water already made, pouring it off rather turbid than in a state of purity. Cork this up and label it: it is now ready for use. Take of this solution two teaspoonfuls, and add it to a little gruel or warm water in which an ounce of Epsom salts has been dissolved in order to make the draught, which may be repeated every six hours. If the calf suffers violent colic pains, a teaspoonful of tincture of opium, with a scruple or half a drachm of ginger, may be given; and injections of gruel, with a teaspoonful of tincture of opium (laudanum), administered. It is not always that this solution is in readiness, or that it can be quickly prepared; we recommend under such circumstances a drench, composed of a scruple or half a drachm of carbonate of ammonia, or two drachms of carbonate of soda, with two ounces of Epsom salts (sulphate of magnesia), and a little ginger, in gruel.

If the calf by these means be relieved, the next object is to prevent a recurrence of the mischief. A lump of chalk may be put into a trough near the young animal, and to which it has free access. The calf will lick the chalk, and the particles of this taken into the stomach will correct the acidity which is so apt to be generated in that viscus. It is a common plan to give chalk to calves under the idea that it makes their flesh white; this is a mistake, excepting so far as good health in the calf produces whiter and better veal. Three times a day only should the calf be allowed to suck, and then not to repletion: a bundle of sweet grass or good hay tied up with a string may be hung before it; it will be allured to pick a little, and the flow of saliva being excited, the digestion will be thereby assisted. If convenient, it may be allowed the range of a paddock or small field with advantage: the air, the exercise, and the smell of the fresh herbage, even its attempts to nibble, will prove beneficial. Weakly calves, and especially such as are fed by hand, often require, on recovering from this distention of the stomach, a total change of food; a raw egg beat up in gruel, made of grits or arrow-root, with a little milk only, and some sugar, may be given for a few days, the proportion of the milk being gradually increased: should the bowels be confined, two ounces of olive oil will act sufficiently.

When the calf begins to change its milk diet for one of vegetable substance, it is liable to distention of the yet feeble rumen with crude materials, or to obstruction of the maniplus, which has not yet acquired sufficient power to act upon hard fibres. This is often the case when the calf is allowed to feed too plentifully on hay. Dulness, fever, constipation of the bowels, and swelling of the abdomen, indicate the nature of the disorder, and unless prompt measures be resorted to, the animal will die. Aperients and the use of the stomach-pump will be required, the rumen must be unloaded, and the maniplus stimulated to action.

Calves are subject to diarrhœa, or scouring, from various causes; the milk may disagree with the stomach and disorder it, change of diet may produce it, or whatever has been taken which irritates the alimentary canal. If not severe, diarrhœa need not be regarded with apprehension; it is an effort of nature to get rid of the irritating matters, and only requires to be checked when it continues too long, or the animal begins to droop. Occasionally, diarrhœa merges into dysentery, with mucous and bloody purging. In the treatment of diarrhœa, a mild purgative, as two ounces of castor oil, may first be given, or three ounces of Epsom salts, two drachms of soda, and half a drachm of ginger, in half a pint of thin gruel. This will remove the cause of disturbance. Afterwards, four tablespoonfuls of the following mixture may be given morning and night: — Powdered chalk, one ounce; powdered catechu, four drachms; powdered ginger, two drachms; powdered opium, half a drachm; mucilage of gum arabic, two ounces; peppermint-water, six ounces. This mixture requires to be shaken up well each time it is given. Gruel, made of fine wheat flour, arrow-root, or bean mashes with a little pea-flour, will be useful; no green or ascescent food should be allowed.

We have described the hoove in cattle, and that affection of the bronchial tubes (see "Bronchitis") in which they are crowded by innumerable parasitic worms. To this disease calves are extremely subject, and it often produces death. There is a hard husky cough, a staring coat, a heaving of the flanks, great debility and emaciation. After death the bronchial tubes are found to be filled with worms, often in incredible numbers. In this disease turpentine has peculiar claims upon our notice, as its use has been in many instances attended with the best results. It acts evidently through the medium of the circulation, being directly absorbed into the system; as it impregnates even the breath, we may easily conceive its effect upon the parasites.

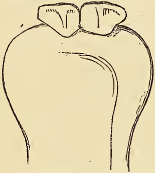
Calves are subject to inflammation of the lungs; the treatment, modified according to the age and strength of the calf, will be the same as that already described in adult beasts. Calves of six months old require only a fourth of the dose of medicine ordinarily given to cattle; and one-half is sufficient for calves of twelve months old.

A disease, termed navel-ill, is apt to appear in young calves between the third and tenth day after birth. Perhaps a little oozing of blood from the umbilical cord at first took place, which was stopped by the application of caustic, or by a ligature too near the abdomen, and the result is inflammation. Sometimes, however, this inflammation comes on without any known cause; the part swells, and perhaps suppurates; in the latter case, as soon as the abscess points, it must be opened by a lancet. Fomentations, poultices, and medicine, consisting of a few two-ounce doses of castor-oil made into an emulsion with the yolk of an egg, constitute the course of treatment. If, however, great debility, as is often the case, should succeed, stimulants may be given, as a little ale in gruel, or a little port wine with powdered gentian (half a drachm).

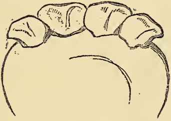
When about a year old calves are very subject to inflammatory complaints. These may be prevented by a little medicine, and keeping them on a scanty pasture. Quick forcing at this period by luxurious diet is one of the great sources of destruction among young cattle; it is by degrees only that they should be brought to a rich grazing ground, or to dry and stimulating food.

THE AGE OF CATTLE.

There are certain points connected with the dentition of the ox which ought to be understood by every practical farmer, for it is by the characters and changes of the incisor teeth of the lower jaw, that the age of the ox may be the most correctly estimated. The regular number of these incisors, as we have stated, is eight; but the first set are deciduous, being gradually shed, and replaced by a new series. The new-born calf has generally two central incisors protruding through the gum, and more or less developed; these, like the others about to follow, are covered with white enamel, and have sharp edges and slender roots. About the

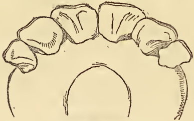


BIRTH.



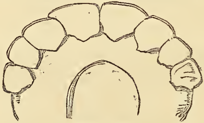
SECOND WEEK.

close of the second week, a tooth on each side of this central pair cuts the gum, making the number four; at the end of



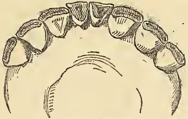
THIRD WEEK.

the third week, the number will be increased to six; and at the termination of the fourth week the full number of the deciduous, or milk incisors, will be complete. At this time the upper line of the sharp edges of the two central incisors has begun to wear, the osseous portion of the tooth appearing where the enamel is abraded; this increases, and, in the course of two months, the next teeth will begin to show signs of wearing, and in about three months the next in succession; till in the course of four months or a little more,

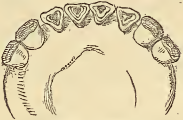


FOURTH WEEK.

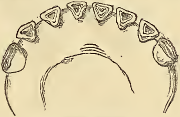
the whole set show the effects of use, but the four central teeth by far the most decidedly. At this time, independently of their wearing down by attrition, the two central teeth begin to diminish in size; at first this is not very perceptible, but in the course of a few months, the change will be very palpable. This diminution is the result of a process of absorption, which goes on with increased rapidity as the new teeth, in their nutrient cells beneath, become more and more developed; the worn surface of the teeth in question assumes a triangular form, with an oblique inclination inwards, the osseous portion appearing as a distinct central mark. At the age of about eight months the diminution and wearing down of the two central incisors is very decided; and before the close of the twelvemonth, the next incisor on each side will show the same appearance, and the four, instead of being close together, will be separated from each other, especially at their base: at the close of fifteen months, the number of teeth



EIGHT MONTHS.

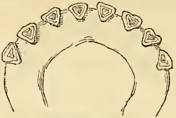


ELEVEN MONTHS.



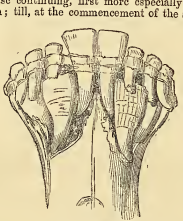
FIFTEEN MONTHS.

thus diminished by absorption, worn by use, and separated from each other, will extend to six; and at the close of eighteen months the whole eight will appear as little worn rudiments. During these changes the ox experiences more and more difficulty in cropping his herbage, and from this cause, and the action going on connected with the formative process of the permanent teeth, in their capsules or cells, the animal is subject to many disorders, and is liable to become out of condition, especially in pasture grounds where the herbage is not abundant and succulent.



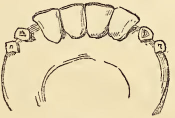
EIGHTEEN MONTHS.

Still these rudiments of teeth remain for some months, their decrease continuing, first more especially in the two central teeth; till, at the commencement of the second year,

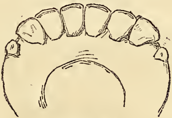


TWO YEARS.

the two central permanent teeth shoot up, and push out the mere relics of their predecessors. During this process, the extremity, or alveolar margin of the jaw itself, is growing and widening, so as to afford room for the development of the rest of the teeth yet in their capsules; and the increase of both teeth and jaw goes on in according harmony. It is not until towards the close of the second year that the next incisor on each side takes the place of its temporary predecessor; nor until the close of the third that the next in rotation succeed. The corner milk-teeth, however, are now mere rudiments, and they give place at the close of the fourth, or beginning of the fifth year, to their successors; in all changes some allowance must be made for the vigour or the weakness of the animal; but such is the average routine.

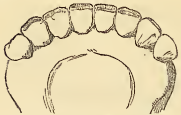


THIRD YEAR.



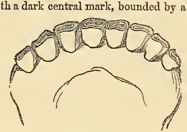
FOURTH YEAR.

The last teeth obtained are smaller than the rest, and can scarcely be said to be fully grown until a few months have elapsed. The whole set is complete, but while the outer teeth have been growing, the two central permanent teeth



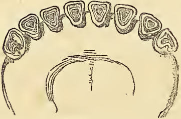
FIFTH YEAR.

first, and then the next, have been wearing, and show the marks of attrition; which, at the age of six years, will have extended to the whole set. The teeth become flattened at the top, with a dark central mark, bounded by a line of bone,



SIXTH YEAR.

and this by the layer of enamel. As yet the four middle teeth are the largest; but, again, by slow degrees, a change takes place, and the process of absorption and wearing down goes on. First, the two central teeth show this, then the next on each side, till, at the age of ten, the four middle teeth are



TENTH YEAR.

smaller than the outermost two on each side, which, nevertheless, are greatly worn. The animal has turned the grand climacteric, and the teeth continue more and more to show the ravages of age; but, as among other domestic animals, and the human species, not invariably to the same extent, the process being slower or quicker according to circumstances. At sixteen the ox is old, but there are many instances in which the cow will give milk to the age of eighteen or twenty; and rare cases are on record in which the cow has given milk, and suckled a calf, at a later date, even in her thirty-first or thirty-second year.

With respect to the grinders, or molar teeth, they cannot be conveniently examined in the living animal; nor, even were they accessible, could a very certain conclusion be deduced from them.

The calf is born with one or two milk grinders on each side, above and below; but by the fifteenth or twentieth day, the number is increased to three.

A fourth molar, permanent, appears in the sixth or eighth month after birth; a fifth molar, permanent, in the twentieth or twenty-second month after birth; and a sixth molar, in about the fiftieth or fifty-second month. The first milk molar is shed about the time when the fifth molar appears, and the second and third, at intervals of ten or twelve months.

CHAPTER IV.

ON THE CATTLE MURRAIN.

This disease, which, although no new introduction, has lately caused such apprehensions in England, and on account of which so many precautions have been taken, deserves a more than common notice in a work devoted to cattle.

In the following remarks I make no pretence to originality, and, indeed, originality was not required; for so numerous have been the suggestions and publications on this all-absorbing topic, that a selection, if judiciously made, from the medical portions, and an abridgment of the historical matter, appear calculated to be of more use than the stating of views either theoretical or hypothetical. I shall, however, propound at some length the *curative* measures which have been found efficacious, not only in this but in other countries; and also those preventive measures which may check the increase of this pestilence—both those which the agriculturist can carry out himself and those which governments have advocated as police regulations, to prevent the introduction of diseased animals, the spread of the disease when introduced, or the consumption of the flesh or milk of diseased cattle. And I shall therefore divide my subject into seven heads.

I.—The disease itself in its three varieties of first, catarrhal affection of the lungs; second, pulmonary complaint, with typhoid symptoms (the *lungenseuche* of the Germans); and, third, a highly contagious typhus, the *rinder-pest* or murrain of the Steppe.

II.—An historical review of the former attacks of this disease, compiled principally from Youatt's interesting Summary in his work on Cattle, and from other sources.

III.—The origin of the present attack.

IV.—The means of prevention.

V.—The means best calculated to cure animals attacked.

VI.—An examination as to the injurious effect likely to result from the consumption of diseased meat, or of the milk from diseased cows.

VII.—The present state of public feeling with regard to the murrain.

I.—The Disease itself.

The name "murrain" gives no clue to the nature of the disease, but, as is often the case in popular terms, it is one applied to diseases of quite a distinct character, but which only resemble each other in being both epidemic and contagious, and in carrying off animals not in single individuals, but in whole herds. On the Continent as well as in England, there is the same want of distinctiveness in the appellation, and therefore it appears advisable to describe all the diseases that pass under the term "murrain" more especially as it is doubtful which, or whether all, of them have been introduced into this country.

The Vienna correspondent of the *Times* newspaper gives in that paper of the 21st April, 1857, so clear a description of those various diseases that I shall not hesitate to copy his account in a slightly abridged form.

There are three complaints which on the Continent are popularly called *Vieh-seuche* (cattle-plagues). The first is a catarrhal affection of the lungs; the second a pulmonary complaint, with typhoid symptoms; and the third, a highly contagious typhus. In letters which have appeared in the *Times*, Mr. Radcliffe speaks of the pulmonary complaint, with typhoid symptoms; Mr. Gamgee, of the contagious typhus, which is the real cattle-plague (*rinder-pest*), or murrain of the Steppe; and Dr. Greenhow, of the "lung-disease," which may mean either the simple catarrhal affection of the lungs, or the pulmonary complaint, with typhoid symptoms.

The principal symptoms of simple catarrhal affection of the lungs are, first, shivering at the commencement of the malady: second, sadness and prostration of strength: third, the pulse is quicker than usual, and there is fever: fourth, the skin feels dry: fifth, the cough, which is at first dry and hollow and comes by fits and starts. After a lapse of four or five days the cough gets "loose," and there is a discharge of phlegm; a rattling noise is heard when the animal draws its breath, and a frothy mucus escapes from its nostrils when it allows its head to droop. It is only under unfavourable circumstances, such as immoderate excitement, a naturally bad constitution, or injudicious treatment, that the catarrhal inflammation of the lungs ends fatally; but a chronic secretion of phlegm and asthmatic cough often remain for a considerable time after the animal is convalescent.

The "lung disease," combined with typhus, may be divided into three periods. The symptoms of the first period, during which there is no fever, are sadness and prostration of strength; secondly, drooping head and pendulous ears; thirdly, eyes fixed, without loss either of lustre or of colour (in vigorous animals the eyes are often red and fiery and dry); fourthly, the skin of the nostrils pale, and the inside of the mouth "slimy;" fifthly, the temperature of the body low, with horns, ears, and feet cool; sixth, the skin dry and tense (stretched), the hair lustreless, rough, and bristly, and erected along the spine; seventh, breathing difficult. The first period sometimes lasts a fortnight or three weeks; the second or feverish period lasts three or four days. The symptoms are those above described, with feverish movements. The diseased animal has fits of shivering, considerable exacerbation in the evening, and remission of fever towards the middle of the day. After the cold or aguish fits are over, the reaction is much less violent than in other inflammatory complaints. Each paroxysm of the fever is accompanied by an acceleration of the respiration, which is audible, and often accompanied by a moaning sound. The weakness and exhaustion of the animal are very great; the temperature of the ears, horns, and legs changes continually —now warm and now cold; the skin is dry and rough, and looks as if dust was strewn on it; the hair is erect, and the eyes, which are opened wide, are projecting, dry, shining, and fixed. The pupil is dilated. The nostrils are covered with a slimy secretion, which the suffering animal frequently removes with its tongue; the teeth are loose; the loins are so sensitive that the pressure of the hand cannot be borne without shrinking, and the pain in the chest increases. The animal lies down but seldom, and when it does so, it is on the side on which the lung is affected. If both lungs are diseased, the animal rests on its breastbone, with its legs under its body, and its head and neck stretched out. The alvine secretion is often either entirely suppressed or very scanty. The urine is dark in colour, and pungent in smell.

During the third period, which commonly ends in death, the uneasiness and agitation of the animal are extreme. It continually changes its position, and draws back from its crib to the length of its tether. The eyes sink and become glazed, and the lids fall as if the animal were about to sleep. The horns, ears, and nose are cold, the mouth is filled with offensive phlegm and slaver, and an ill-coloured secretion flows from the nostrils. The animal gnashes its teeth, which are loose and shaky; the hair becomes more and more bristly, and the emaciation is rapid. At this period of the disease the pulse is often 100 per minute.

The real cattle plague or, as it is called in Austria, the *loserdurre,* has four periods. During the first period, which begins about five days after the infection has been taken, the following symptoms are observable:—1. The animal is generally languid, its movements are heavy, its gait is tottering, and it is less sensible than usual to outward impressions: in other cases it bellows and beats the ground with its hoofs, and is unusually unruly and vicious. 2. The appetite is often much greater than usual, but after the animal has swallowed its food it appears inattentive to what is passing around it, and hangs its head and ears. 3. When the animal rises from the earth it does not stretch itself, as healthy animals usually do, and instead of sinking its back it arches it. 4. The eye has more lustre than usual, and its vessels are slightly reddened. 5. Tremulous movements are perceptible in the skin, and the hair in some parts of it becomes rough. 6. After the fourth or fifth day the animal coughs at intervals and often groans. 7. The animal licks its chaps less than usual. 8. No strong pressure with the hand can be borne, and the back immediately sinks if the loins are squeezed. 9. The "droppings" are drier and less furrowed than is usual. On the eighth day after the infection, the plague is regularly declared. The symptoms are:—1. Aguish paroxysms, and often a twitching of the whole skin. 2. Bristling of the hair. 3. Trembling of the limbs, and particularly of the hind quarters. 4. During the paroxysm, the animal is generally very uneasy; it stamps, holds up its head and shakes it continually. The vigorous cattle are very violent in their movements, have a wild eye, snort and bellow, and devour their food greedily. The weak and aged beasts which are less wild and unruly, shake their heads and grind their teeth. 5. The roots of the horns and the hanging ears are sometimes very hot and sometimes cool. 6. The chaps and muzzle are dry, the interior of the mouth is of a light red and "steaming hot," the gums swollen and spongy, and the incisors somewhat loose. The gums have frequently spots of a deep red. 7. The sensitiveness of the loins increases. 8. The skin is extremely tense. 9. The pulsation is accelerated. 10. A single (not continuous) violent, hollow, and convulsive cough, which is totally different from any other. 11. The rumination is incomplete and interrupted. 12. The alvine secretion is scanty, dark, sometimes almost black, parched, and deeply furrowed. Tho discharge takes place very frequently. 13. The tail is either extended in a horizontal line or used to strike the sides of the animal, which continually looks round to its hind quarters. 14. The urine is of a high red colour. 15. It is frequently the case that air-bladders can be felt under the skin on the back and loins. 16. The fever increases in the evening, and becomes less violent in the morning. 17. The milk in cows diminishes, and in some cases is altogether dried up. During the third period, which begins on the ninth or tenth day from the infection, all the above-mentioned symptoms increase in violence. The animal is excessively weak, and sad, stands at a distance from the crib, and hangs its head almost down to the ground. If the lungs are much affected it lies down a great deal; but if not, it remains on its legs. The emaciation is extreme. The eyes begin to run, and a clear white viscous fluid flows from the nose. By degrees the tears thicken and form a crust which half covers the eye, the discharge from the nose becomes cloudy and "glandery," the tongue is flaccid, and the breath has a peculiar and almost putrid smell. The rumination ceases entirely. The alvine secretions are now watery, and are ejected, or rather squirted out, with violence. The animal suffers greatly from tenesmus. If there is no diarrhœa, which is sometimes the case, the hind part of the body is greatly swollen. On the thirteenth or fourteenth day, when the complaint has reached the highest pitch, the fourth period begins. The animal can hardly keep on its legs, a thick ash-grey fluid runs from its glazed eyes, a corrosive secretion escapes from its nose, a thick phlegm fills its mouth, and the putrid exhalation becomes almost unbearable. The skin of the mouth and the gums is dried up, "and the tallow-like skin of the animal peels off in great flakes." The serous and ever bloody alvine secretion is discharged almost without interruption; the head of the suffering animal is continually twisted round to its hind quarters. Death generally ensues on or about the seventeenth day after the infection.

The *Times* correspondent gives the symptoms of these three diseases at great length, in order that English veterinary surgeons, previously unacquainted with the disease, may distinguish the symptoms.

He has evidently translated and abridged his account from the reports drawn up by order of Government, in those countries where the murrain is prevalent. It is, therefore, the result of experience; and though the symptoms are described with too much formality and minuteness, in the German manner, it is, I think, likely to be useful.

Youatt, in his valuable work on the Ox, describes this disease as a malignant and typhoid form of the epidemic catarrh—he says:—

"Epidemic catarrh much oftener assumes a malignant form in cattle than in horses, on account of the greater vascularity of the system, and intensity of febrile action, and consequent vital exhaustion. It also appears as a disease which is malignant from its very commencement. In former times it was the pest of cattle, while horses comparatively escaped; and in the present day, there is no disease of the horse, with the exception of farcy and glanders combined, so malignant as the murrain of cattle. It once used to sweep away the horned stock of whole districts, and there are few years in which it is not now seen in some part of the kingdom. It is here ranked under the diseases of the respiratory system, because that system is usually first of all affected, and for a longer or shorter time alone affected: but the disease gradually takes on a typhoid character, and its pestilential influence invades every portion of the frame. It principally appears in marshy and woody districts, or where underdraining has been neglected, or the cattle have been exposed and half starved.

"There are few diseases that assume, in the earlier or later stages, a greater variety of forms; but, disarmed of somewhat of its virulence in modern times, it will generally be distinguished by some, or the greater part, of the following symptoms.

"There will be cough, frequent and painful, and, in many cases, for a week or more before there is any other marked symptom. The farmer may not always be aware of this, but he will find it out if he inquires about it, and be soon fully aware of the importance of the fact.

"After a few days some heaving of the flanks will be added to the cough; the pulse will be small, hard, frequent, and sometimes irregular; the mouth hot; the root of the horn cold; the fæces sometimes hard and black, at others liquid and black, and then very fetid. Presently afterwards, that of which we have to speak again and again, is observed extreme tenderness along the spine, and particularly over the loins. The cough becomes more frequent and convulsive, and a brown or bloody matter runs from the nostrils and mouth; the eyes are swelled and weeping; the patient grinds his teeth; there is frequent spasmodic contraction about the nostrils; and the animal rarely lies down, or, if he does, rises again immediately.

"The eyes soon after become unusually dull; the pulse remains small, but it has become feeble; the respiration is quicker; the flanks are tucked up; the tenderness on the loins is removed; insensibility is stealing over the frame; and the fæces are more loaded with mucus and more fetid. The patient moans and lows, and grinds his teeth almost incessantly; the head is agitated by a convulsive motion; blood begins to mingle with the fæces; the breath and even the perspiration become offensive; and the beast staggers as he walks.

"Tumours and boils now, or even earlier, appear on various parts. If they are to come forward, the sooner they rise the better, for much depends on what becomes of them. If the animal has sufficient strength for them to go through the usual process of suppuration, although the sloughing and the stench may be greater than could be thought possible, the beast will have a chance to recover; but if there is not energy to bring them forward, if they become stationary, and most assuredly if they recede and disappear, the patient will die."

Mr. Youatt thus gives an eloquent description of the real cattle murrain, which is identical in its symptoms with that of 1747, as fully described then by Drs. Brocklesby and Hird, so much so that it would be merely repetition to give their account or an abstract of it.

But there is yet another kind of murrain, equally or more destructive to cattle, which appears to be principally a violent diarrhœa or dysentery, and from an account given by J. N. Radcliffe, Esq., M.R.C.S., of the murrain which prevailed at Sinope and other parts of Asia Minor in the summer and autumn of 1855, I extract the following symptoms:—

"The attack of the disease appeared to be invariably sudden, and the progress was singularly uniform. The animal attacked was seized with profuse diarrhœa; exhaustion rapidly followed, the animal sinking to the ground; the breathing became oppressed; a thick glairy mucus trickled from the eyes and nostrils, and death occurred within *nine* hours from the commencement of the attack; the duration of the disease rarely, indeed, exceeded *six* hours.

"The first symptom of the disease was characteristic. The animal would suddenly void from the bowels, in a thick stream, an enormous quantity of fluid matter, which was either of a pale yellow or of a brownish colour. The evacuations invariably contained shreds and flakes of lymph, and generally, sooner or later, more or less blood. The most common appearance of the evacuated matter was that of a yellowish-coloured fluid, in which shreds of lymph were floating. Frequently, as the animal lay exhausted upon the ground, gouts of mucus, streaked with blood, would be seen in and about the *anus*."

The difference between this and our English murrain appears to be that the organs of digestion were principally attacked, and in the rapidity and fatal character of the disease, for Mr. Radcliffe observes that he did not hear of one instance in which an animal attacked with the disease recovered. Difficulty of breathing is mentioned as one of the minor symptoms; and, on *post-mortem* examination, the lungs generally were found gorged with frothy mucus; yet, as no cough is mentioned, it appears to be decidedly distinct from other kinds of murrain, and to be one of which we happily have no experience in England. The condition of the town and of the adjacent country is described as being most horrible during the prevalence of the murrain. The beach, the ditch, the base of the walls, the roads, the woods, the hill-sides, and the open spaces were studded with putrefying carcases, and foul stenches assailed the nostrils on every hand.

The cause of the disease was uncertain. It was reported that it was contemporaneous with epidemic cholera; but this did not prevail to a greater extent in Sinope than the excessively filthy and crowded condition of the town might give rise to.

Nor did it arise from ill-ventilation and improper management in the British Commissariat depôt, for the sheds there were large and lofty, well ventilated, and kept in excellent order, and very free from smell. They were, however, overcrowded, each shed containing 320 cattle.

Other animals were seized with a like mortality, as in the autumn and winter great part of the camels in the Land Transport Corps depôt died. But this might have arisen from other causes, as the animals were densely crowded together, with little attention to cleanliness; and it was suspected that the feeding was bad and insufficient, from peculation by the native attendants.

To show more clearly the difference between this disease and the pulmonary murrain, I quote the following from an essay by G. Waters, jun., M.R.C.V.S., on Pleuro-pneumonia in Cattle, and I especially do this because he has entered so fully into the lung symptoms. After mentioning that the first and most constant symptom of this disorder is "a cough of a dry or husky character," which after a short period became "short and frequent," and increased upon exertion, he goes on:—"Upon applying the ear gently to the sides of the chest, so as not to frighten the animal, one or other lung is found to be affected, and the right much more frequently than the left; sometimes, though rarely, both are implicated; but whichever lung be affected, the respiratory murmur in the other becomes louder and coarser than usual; the sound on percussion is natural.

"On the affected side, if the pleura should be inflamed, coincident with the lung or a portion of it, a peculiar crackling or fine *crepitus* is audible; this is limited to a small space in the beginning, but as the disease advances it becomes more diffused. This *crepitus* at first may be mingled with the ordinary respiratory murmur, which it nearly obscures; as the inflammation advances it becomes more and more decided, until at length no respiratory murmur whatever can be heard throughout the part or parts occupied by the crackling. As the morbid action proceeds, the *crepitus* gradually disappears, giving place to other sounds; one of a puffing or blowing description may be heard during inspiration, as if confined to the bronchial tubes, and when the animal grunts or coughs the sound is conveyed directly to the ear. These sounds are most distinctly heard when the inflammation is confined to the upper and anterior parts of the lung, and when no effusion has taken place into the cavity of the pleura.

"At the same time, and in variable spots, another symptom presents itself to the ear, viz., that of friction, or rather creaking: this sound may be heard both in inspiration and expiration, but is more prononneed during the former; it is very inconstant both as regards its duration and locality, as it may be heard most distinctly in one particular spot one day, and no trace be detected in the same place on the following.

"On striking the affected side at this stage of the complaint, a dull sound is usually elicited to a greater or less extent; but this will depend on the amount of lung which has become inflamed, and the presence or absence of fluid in the chest.

"These sounds offer various modifications according as the pleura or substance of the lung itself is most inflamed: thus, if pneumonia predominates, the creaking is slightly, if at all, heard, and the dulness on percussion is not so flat and general; while, if a larger proportionate amount of pleurisy exists, bronchial respiration, bronchophony, and the rubbing sound may be heard, while little or no crepitation is audible; a marked difference is also observed on percussion, the dulness is more depressed and dead, and principally confined to the lower parts of the chest, owing to the presence of fluid, which, in all cases we have examined, has become rapidly and abundantly effused when much pleurisy existed."

The animal seldom survives this state; and in the last stage of all, Mr. Waters thus describes the lung symptoms, in the majority of cases: "No sound whatever is heard on the diseased side, except a loud gurgling, which is audible at some distance, with general dulness on percussion."

I have thus at some length given the symptoms of those varying diseases which are classed under the the term "murrain." An interesting question now arises, whether the disease mentioned by ancient writers was identical with ours. To decide this point, we can do no better than refer to Virgil's Georgics—a well-known book, descriptive of agriculture, and written by one well acquainted with the subject, who thus describes the murrain as it devastated some of the Roman farms about fifty years before the Christian era. The disease he alludes to resembles that Continental murrain of the present day, called by the French *Fièvre pernicieuse carbonculaire; i.e.* inflammation of the cellular texture beneath the skin, causing excessive pain on pressure, and proceeding to the formation of tumours, ulcers, and deposit of purulent fluid everywhere. After death no blood follows the knife, but a yellow glairy and pus-like fluid.

I quote from Dryden's translation.

> "Here from the vicious air and sickly skies,
> A plague did on the dumb creation rise;
> During the autumnal heats the infection grew,
> Tame cattle and the beasts of nature slew,
> Pois'ning the standing lakes and pools impure:
> Nor was the foodful grain in fields secure.
> Strange death! for when the thirsty fire had drunk
> Their vital blood, and the dry nerves were shrunk,
> When the contracted limbs were shrank, ev'n then
> A wat'rish humour swell'd and oozed again,
> Converting into bane the kindly juice,
> Ordained by nature for a better use.
> The victim ox that was for altars prest,
> Trimm'd with white ribbons and with garlands drest,
> Sank of himself, without the god's command,
> Preventing the slow sacrificer's hand.

Or by the holy butcher if he fell,
The inspected entrails could no fates foretell:
Nor laid on altars, did pure flames arise;
But clouds of mouldering smoke forbade the sacrifice.
Scarcely the knife was redden'd with his gore,
Or the black poison stain'd the sandy floor.

* * * * *

The thriven calves in meads their food forsake,
And render their sweet souls before the plenteous rack.
The fawning dog runs mad, the wheezing swine
With coughs is choked, and labours from the chine:
The victor horse, forgetful of his food,
The palm renounces and abhors the flood;
He paws the ground, and on his hanging ears
A doubtful sweat in clammy drops appears:
Parch'd is his hide, and rugged are his hairs.
Such are the symptoms of this young disease:
But in time's process, when his pains increase,
He rolls his mournful eyes, he deeply groans
With patient sobbing, and with manly moans.
He heaves for breath: which from his lungs supplied
And fetched from far, distends his labouring side.
To his rough palate his dry tongue succeeds,
And ropy gore he from his nostril bleeds.
The steer who to the yoke was bred to bow
(Studious of tillage, and the crooked plough)
Falls down and dies, and dying voids a flood
Of foamy madness, mixed with clotted blood.
The clown, who, cursing Providence, repines,
His mournful fellow from the team disjoins:
With many a groan forsakes his fruitless care,
And in the unfinish'd furrow leaves the share.
The pining steer nor shades of lofty woods
Nor flow'ring meads can ease, nor crystal floods
Roll'd from the rock; his flabby flanks decrease;
His eyes are settled in a stupid peace;
His bulk too weighty for his thighs is grown;
And his unwieldy neck hangs drooping down."

GEORGICS, Book III. verses 478, &c.

The same variation in the symptoms of the disease, according to peculiarities of treatment, and to the different localities, and the same want of exactitude in naming it, existed some centuries back as at present.

In 1682, the symptoms of an epidemic attack in France, which destroyed immense numbers of cattle, are given thus: "A violet-coloured vesicle is found under the tongue, on which an eschar or scab forms in five or six hours, and on the falling of the eschar the animal dies; and when opened, the intestine was found in a state of gangrene, and so was the tongue, for it often fell to pieces." The animals, it was stated, ate and worked as usual, until they fell dead in a moment. This latter impossible statement shows the carelessness even of the scientific men of that day. This disease was glossanthrax, or blain, which has been already described, but of a very malignant character, and associated with murrain, as it sometimes is now.

In 1711, the disease appeared in Italy, with symptoms more resembling those of the murrain of the present day. It commenced with a shivering fit, followed by unnatural heat, extreme thirst, difficulty of breathing, and general debility. A thick mucous discharge from the nose and mouth speedily succeeded, attended by a very unpleasant smell. There were twitchings of various parts of the frame, frequent fetid and bloody ejections, and the appetite and rumination ceased. On the fifth day there was a pustular eruption in the mouth, which covered the tongue and the pharynx, and abscesses followed, and the bones beneath quickly became carious. The cattle died generally on or about the fifth or ninth day.

The hair usually came partly or entirely off. If after the fall of the hair the skin became firmer, or if the disease attacked the legs or thighs, and there were swellings of the joints, or about the limbs, and which almost prevented the motion of the animal, he generally recovered. Cows that gave milk often survived, but their calves uniformly perished.

On examination after death, ulcers were found at the root of the tongue, and gangrene in the intestines. The third stomach always contained a hard, black, infections mass, which adhered to the lining membrane, and could scarcely be separated from it.

The disease some years afterwards began to exhibit new symptoms. If it first attacked the membrane of the nose, it sometimes confined its virulence to that and the neighbouring parts, and the malady assumed the precise form of malignant acute glanders. The septum was ulcerated through and through, and the horse and the ox died in consequence of the local mischief there done, and the constitutional irritation consequent upon it, without determination of the malignant principle to any other part.

If the first attack was on the alimentary canal, there the fury of the disease was expended, and the animal was destroyed by dysentery; if the membrane of the mouth was affected, it was soon covered by tumours of greater or less size, and many of them running on to ulceration. The great European attack of 1745 appears to have been identical with the pleuro-pneumonia, although far more widely spread and more generally destructive. It commenced with a dry short husky cough, as at present, which, though lasting six or eight days, was generally overlooked, as cattle often suffer from hoose, especially in spring and autumn; this was followed by staring coat, heavy eyes, and milk decreasing, unpleasanttasted, yellow, and finally totally absent. Then the more serious attack commenced with a shivering fit, and the disease ran its course identically as at present. "Some died almost suddenly, in others inflammation of the brain seemed to come rapidly on, and the cattle became so furious and dangerous that it was necessary to destroy them. Most died on the sixth or seventh day, and very few lived on to the eleventh."

In 1757 it appeared again in France, assuming a somewhat new character. It was compounded of inflammation of the tissue beneath the skin, shown by the appearance of tumours on every part, associated with acute inflammation of the lungs. It spread from cattle to horses. The ass, for the first time, fell a victim in great numbers. The stags in the neighbouring forest did not escape, and many flocks of sheep, over which these epidemics usually pass harmlessly, were swept away.

In 1758, in Finland, it assumed yet another form, modified by the climate and many local causes. Some cattle were taken all at once. There was violent trembling amounting almost to convulsion of every limb, and blood ran from the nose and bloody slime from the mouth, and the animal died in a few hours. In other cases the attack was not so violent; but, after the shivering fit, tumours began to form between the thighs, or on the front of the breast, or beneath the jaws; when the jaws were affected the patient was supposed to be most in danger. Diarrhœa usually followed. If it appeared early, it seemed to be an effort of nature to throw off the evil, and frequently a successful one: if it came on after the second or third day, the beast had not long to live.

But varying as this disease is, it yet may be divided into the three following forms, of which, happily, only the first two have yet appeared in England.

1st. The epidemic or foot and mouth disease of cattle, which also affected pigs and sheep. This fifteen or sixteen years ago spread over our island with great virulence, yet was seldom fatal, but yielded to cooling aperients and lotions of astringent applications.

2nd. The *pleuro-pneumonia* or murrain, so called from combining *pneumonia*, or inflammation of the lungs, with *pleurisy*, or inflammation of the *serous* membrane which invests the lungs and lines the chest. This is the destroyer of our beasts.

3rd. The *Steppe murrain*, propagated by the skins or clothing of diseased animals. This, which somewhat resembles the plague in man, has neither reached our shores nor approached within several hundred miles, being, as Professor Symonds has shown, only to be found in Poland and Russia, and occasionally in the neighbouring countries.

II.—AN HISTORICAL ACCOUNT OF FORMER ATTACKS OF THIS DISEASE FROM THE EARLIEST TIMES.

The murrain is not, as many persons suppose, a new disease, either in itself or in this country; probably in its milder forms it is never absent from England, and attacks of a malignant and sweeping character make their appearance at varying periods.

From the following historical summary, principally abridged from Youatt, it will be found that murrain is mentioned in the oldest record we have—the Bible—in the destruction of the cattle of the Egyptians (Exod. ix. 2, &c.): "If thou refuse to let them go, behold, the hand of the Lord is upon the cattle which is in the field: there shall be a very grievous murrain. To-morrow the Lord shall do this thing in the land. And the Lord did that thing on the morrow, and all the cattle of Egypt died."

During the siege of Troy vast numbers of the cattle of the Greeks, and of the Greeks themselves, are said to have perished by a pestilence. Homer, the father of Grecian poetry, who is supposed to have written about 900 years before Christ, in attributing the disorder to the arrows of Apollo, might only have meant that they arose from pestilential vapours drawn up by the rays of the sun, and that brutes received the contagion first, as their feeding-places were more in the site of the marshes giving forth the malaria.

> "On mules and dogs th' infection first began,
> And last the vengeful arrows fixed on man."
> POPE'S *Translation.*

Plutarch tells us that, during the reign of Romulus, a pestilence, after destroying the fruits of the earth and the cattle, swept off many of the Romans; and Livy, speaking of another visitation of the pest, says that the consuls had the greater difficulty in raising their recruits, because the plague which the year before had raged amongst the horned cattle, had then broken out among the men.

Virgil's "Georgics," written by one practically acquainted with agriculture and brought up as a farmer, gives a long history of the murrain as it devastated some of the Roman farms. His account is evidently drawn from personal experience, and is by far the best early description of the disease. I have given the translation of the symptoms in a previous portion, so that the reader may compare the varying symptoms at different times.

Of the attacks of this disease during the Middle Ages there are few and meagre accounts. But we learn that in the year 376 A.D. a murrain broke out among the cattle over the whole of Europe. Cardinal Baronius, either superstitiously or as a pious fraud, states that "none escaped but such as were marked in the forehead with the sign of the cross; by which miracle many people were converted to Christianity."

In 810 every head of cattle was destroyed in the Emperor Charlemagne's army and also throughout the greater part of his dominions. In 1514 and 1599 the Venetian states were so ravaged by it, that, to prevent the supposed ill consequences of eating the flesh of tainted beasts, as well as to save the little remnant of cattle that was left, all beef and veal were forbidden by the senate to be eaten throughout their state.

But it was in 1711 that the epidemics commenced, which, although somewhat suspending their ravages for a few years, or rather visiting new districts when they ceased to desolate others, continued to be objects of terror until the establishment of veterinary schools.

The origin of the epidemic of 1711 is clearly traced. Some cattle-merchants were importing, according to their annual custom, beasts from Dalmatia, which were in request in some parts of Italy. One of these oxen being taken ill and straying from the herd, was abandoned by the merchants in the neighbourhood of Padua. A servant of the canon of Padua found him, and, whether with or without the knowledge of his master does not appear, took possession of him, and put him in a cowhouse among others that were perfectly well. In a few days he died; but not until he had infected every beast, and so surely, that all died except one, in whose neck setons had been placed.

The contagious nature of the disease finding a too powerful auxiliary in some peculiar state of the atmosphere, the malady quickly spread through the whole Venetian territory. The pest was soon propagated over the greater part of Italy. It appeared in Milan under even a more virulent character than it had assumed in the Venetian states; and when it reached the duchy of Ferrara, it had so fearfully acquired strength as it proceeded, that it was the prevalent opinion among those best informed, that the whole species of horned cattle would speedily become extinct. As it travelled, it selected other victims, and horses, deer, swine, and domestic poultry were attacked.

Amongst other absurd ideas as to its nature and cause, it was affirmed that many of the cases of murrain arose from the stings of hornets, which had burrowed to the carcases of those cattle that had died and been buried the preceding year; and some persons even pretended to find the black stings of these insects in the affected animals.

In 1714 it reached Piedmont, still apparently increasing in malignity. According to Fantoni, professor of medicine at Turin, more than 70,000 cattle perished in that little territory.

From Piedmont it found its way into France. All the provinces in the south of France, and bordering on Germany, were devastated by it. Its progress now was fearfully rapid and murderous: before the end of the year it had reached Brabant and Holland, in the latter of which at least 200,000 cattle perished; and it had crossed the Channel to England, where it was as destructive as on the continent, though there are few details of its history or specific character there.

In a few years its extensive ravages seemed to cease, or it confined itself to certain districts. Yet, in 1731, a peculiar epidemic, similar to one prevalent in the same districts in 1682, committed great ravages in France. It was *glossanthrax*, or blain, of a malignant character. The vesicle formed most rapidly; if neglected, suffocating the animal in less than twenty-four hours; or if it broke, was succeeded by a chancrous ulcer, far more corroding than chancres generally, which, destroying the tongue and the posterior parts of the mouth, produced the death of the animal.

In 1743 and 1744 the real murrain appeared again with increased fury, in the north of France and great part of Germany.

In 1745 it laid Holland waste a second time. More than 200,000 cattle now perished. In the same year it again found its way to the coast of Britain. It seems to have been certainly brought from Holland; but there are two versions of the story. Dr. Mortimer says that it was imported by means of two white calves which a farmer at Poplar sent for, in order to cross his own breed, and that it spread into Berkshire by means of two cows that were brought out of Essex. The other account is, that one of our tanners bought a parcel of distempered hides in Zealand, and which were forbidden to be sold there and should have been buried, and so transplanted this dreadful disease amongst us. "Thus by one man's unlawful gain," says Dr. Layard, "if by this way it was conveyed, the ruin of many graziers and farmers was effected. It is certain, however, that the pest first appeared in the immediate neighbourhood of London, and on the Essex side of the river, and that thence it gradually spread through Essex and Hertfordshire, and the whole of the kingdom.

For more than twelve years it continued to lay waste the country. The number of beasts that were actually destroyed by it was not, and perhaps could not, be ascertained; but in the third year of the plague, when the government had so seriously taken up the matter as to order that every beast that exhibited the slightest marks of infection should be destroyed (a remuneration being made to the owner), no fewer than 80,000 cattle were slaughtered, besides those which died of the disease, and which formed, according to the narration of one of the commissioners, nearly double that number. In the fourth year of the plague they were destroyed at the rate of 7,000 per month, until, from the numerous impositions that were practised, this portion of the preventive regulations was suspended.

In the year 1747, more than 40,000 cattle died in Nottinghamshire and Leicestershire; and in Cheshire 30,000 died in about half a year.

The disease was evidently epidemic. It would cease, in a great degree, towards the approach of summer. During one or two summers in the twelve years that it raged, it seemed to have altogether disappeared; but at the approach of winter it broke out afresh, sometimes in districts the cattle of which it had previously thinned; at other times in places which had hitherto escaped, and at a great distance from those where it had gradually died away. It prevailed most generally, and was most fatal, during the latter part of winter. February, and sometimes March, were destructive months. It was also strangely capricious. It would carry off half the cattle in all the dairies round a certain farm, and then, perhaps, six months after, pounce upon the farm then left uninjured, and leave not an animal alive. On some farms the disease readily yielded to the power of medicine or of nature, so that not one animal in a dozen died. On the next farm, soil, produce, and management apparently the same, not one in a dozen was saved. Its virulence evidently depended on some mysterious atmospheric agency.

That the disease was contagious was certain, and the orders in council for the non-removal and slaughter of infected beasts, and their burial within three hours, were founded on this certainty.

Its introduction into Padua in the first instance, and its propagation, proved that immediate contact communicated it; even the touch of a person or thing that had been in contact with the diseased animal. And this fact excited very great alarm; perhaps, in some cases, greater than was justifiable.

It is the character of these epidemics gradually to wear themselves out. Frequent, malignant, and fatal as they are at first, they become in process of time more rare and tractable, and at length disappear, or select some other country, near or remote, as the scene of devastation.

About the year 1758 the epidemic was evidently declining throughout the whole of the kingdom; but it could not be said to have quite left us for several years afterwards.

The same year that it diminished in Britain (1758), it had spread to Finland, where it assumed another and more rapidly fatal form; and from Finland the disease passed into Russia, and was very destructive there.

Thus this fatal disease had prevailed through Europe with few remissions, and those very short, for half a century, and had gradually extended from the south to the extreme north of that continent.

I have thus given a brief summary of former attacks of this disease, both in England and on the continent, and must now consider what can be learned from these facts instructive to us at the present crisis. Shall we console ourselves with the idea that more destructive epidemics of the same kind have been experienced, and yet have, after a few years, wholly disappeared, and may we trust that, with our increased science and knowledge in the veterinary art, we may still more succeed in diminishing its fatality; or shall we, looking on the dark side, be warned that, severe as the present attack is, it is in the nature of the disease to be still more destructive and more general; that it has once before defied medical skill, and only disappeared when the mysterious cause, be it atmospheric or electrical, has likewise disappeared; and that, as it is just a century since it ceased to be a national evil, that this cycle of years may again bring it in renewed intensity?

There is room both for hope and fear in these considerations; but, all things considered, the first, I think, greatly predominates.

III.—PRIMARY CAUSES OF THE DISEASE, AND ORIGIN OF THE PRESENT ATTACK.

The causes which produce the spontaneous development of pulmonary murrain are stated by E. H. Greenhow, M.D., to be variable and intemperate weather, and hot, crowded, and foul stables. M. Delafond enumerates cold, and especially the respiration of a cold, moist, foggy atmosphere, such as prevails in moist pastures, particularly in spring and autumn, as among the causes which generate the complaint, independently of contagion. He also attaches much importance to the character of the breed, asserting that a liability to the disease is capable of hereditary transmission. This view harmonizes with the opinion of a person farming largely in Shropshire, that the disease has never been known to prevail amongst the Hereford breed of cattle, except when there was distinct evidence of contagion. In Mr. Gabriel's Report to the Epidemiological Society, it is said, "The weather at the majority of the outbreaks is stated to have been wet, cold, and gloomy; in a few instances only the disease appearing in fine weather." And in confirmation of this belief, the members of a Belgian commission report that the disease is most prevalent between the months of October and April, and that it rages with the greatest intensity in October and November. Defective ventilation and want of cleanliness are no doubt very prejudicial, yet, in the London dairies, the disease was most severe in one of the best-ventilated and cleanest. On examination, it was, however, found that the ventilation was so excessive as to keep the animals in a perpetual current of cold air, which is doubtless equally injurious to animals as to man, as is an atmosphere loaded with particles of dust, which (as might be predicted) is, in the case of dusty hay and chaff, said to be an aggravating cause of pulmonary murrain.

The kind of food, so far as is yet known, appears to have but little influence in the causation or aggravation of the disease; animals fed on grass being equally liable with those fed on grain, mangel-wurzel, hay, and straw. Well-fed animals in good condition are, however, universally allowed to be the least liable to suffer. M. Delafond mentions the drinking very cold water in winter, and of stagnant water in summer, as occasional causes of the disease.

Danish and German authorities quoted by Mr. Greenhow lay greater stress on the contagious nature of the disease than do English writers. They assert that it extends itself, not only by material objects (such as stalls, fodder, persons, and cattle coming into contact, or within the influence of the exhalations from the diseased cattle), but that it transmits itself for a limited distance through the air, the range of its influence being about eighty paces. They suppose also that an infected object (as a stall, &c.) will transmit the disease for several months, and that grass meadows also retain the power of infection for some time. Also that convalescent cattle infect others several months after their apparent recovery. Irrespective of infection, the disease is occasionally induced by cold, dampness, marshy or undrained grazing-grounds, bad drinking-water, spoiled fodder, ill-ventilated and unclean stalls, an excessive proportion of watery food, &c. But they consider that none of these causes could either produce or maintain the disease; but that it has always been introduced from some foreign country, and then propagated by infection.

Mr. Greenhow, writing on the analogies of pulmonary murrain with human diseases,—the coincidence in the time of its appearance with human and vegetable epidemics, and the possible co-relations of blight, murrain, and pestilence,—states that this disease has resemblances to both hooping-cough and influenza in the human subject. Like hooping-cough, it is at once epidemic and contagious. Pathologically, it has a much closer affinity with influenza than hooping-cough, but differs from both in its inflammatory character; inflammation, which appears to be inseparable from pulmonary murrain, being only a complication in those human diseases. Its visitations, like those of influenza, are uncertain, and not immediately referrible to any definite condition of atmosphere. Pulmonary murrain does not strike the cattle of a whole district, as influenza does the human inhabitants of a considerable area; but attacks by a succession of local outbreaks. Its reappearance in the present century, after an absence of nearly a hundred years, is a most important fact in its history, particularly when considered in conjunction with the occurrence of cholera in the human subject, and of the potato disease and other blights among vegetables, at nearly the same period of time. Blight, and murrain, and pestilence have often been associated as calamities. Perhaps they are not altogether unallied in their causes. Pulmonary murrain may possibly be dependent on some obscure circumstances of breed, feeding, or management. It can scarcely be referred exclusively to any atmospherical cause, as it would probably then have been a frequent and well-known visitor. Whether the epidemic influences from which man suffers, act also on the lower animals, and on the vegetable kingdom, and whether the causes of their epidemic diseases affect ourselves, are a yet unopened, but nevertheless important, field of inquiry. It is indeed true that the materials for solving these questions are at present most scanty; but the study of human with animal and vegetable epidemic diseases could not fail to elucidate many still obscure facts, and to throw important light on the pathology, not only of man, but likewise of those animals whose well-doing is externally associated with his material prosperity.

The origin of the present attack in Britain may be traced to an eruptive disease which broke out in 1839, and that was popularly called the "foot and tongue disease," or the "old epidemic," as distinguished from the "lung disease," or "new epidemic," as it is often termed. The eruptive disease was characterized by apthous ulcerations of the mouth, lips, and nose, and by swelling of the fauces, causing a constant slavering or dribbling of frothy saliva; by vesicles and ulcerations of the feet; and by pustules and ulcers of the teats, accompanied by inflammation and abscesses of the udders.

The epidemic was the forerunner of the more serious and fatal pulmonary affection; much as influenza has occasionally preceded outbreaks of cholera and dysentery in the human subject.

In 1840 the eruptive disease was general in England, and was contagious, but is now much less frequent. It has often been considered as the same disease as pleuro-pneumonia, only attacking other organs. Mr. Faussett considers the eruptive disease as only the primary stage of the pulmonary affection, which he calls the secondary distemper, and which he says follows the former at variable intervals. So far as his inquiries extended, he found the eruptive disease had, with a single exception, invariably preceded pleuro-pneumonia. Still the balance of facts seems to show that the supposed inter-relation of the two diseases is imaginary, for they have often co-existed in the same herd; and the mild eruption often occurs without being followed by pleuro-pneumonia, which, on the other hand, frequently attacks animals that have not suffered from the so-called primary distemper.

This eruptive disease was followed, after an interval of two years, by an epidemic of *pleuro-pneumonia*, a disease that has been very destructive and fatal, it is said, to upwards of fifty per cent. of the animals it attacks. Since 1841 it has never entirely disappeared; for though it manifests itself from time to time more generally, and in an epidemic form, it never fails to linger in several parts of the country during the intervals of its more extensive visitations. It has been prevalent in Bedfordshire, Buckinghamshire, Shropshire, Cheshire, and has appeared in isolated instances in most other counties of England.

In Ireland the disease appeared simultaneously with England. In Cork, in 1841; in Meath, in 1842, and for seven or eight years afterwards; in Roscommon, in 1842; and in Galway and Limerick, 1843. The disease was preceded by the eruptive disease, which malady, it was observed, although no safeguard from the lung distemper, never itself attacked the same cattle twice.

In the course of the present year fears were entertained that a disease, new to the country, might be introduced,—the *steppe murrain;* and Mr. Symonds was instructed by our Royal Agricultural Society to travel into the supposed infected districts, and report as to the likelihood of its introduction. His report, and the letters from her Majesty's consuls, have allayed these fears, and shown that we need not dread this new pest, as it has never been known in the countries that supply us with cattle.

General Mansfield, the consul at Warsaw, writing on March 19th, 1857, states the disease as still prevalent in Russian Poland, though not so much as in the autumn. The disease, he adds, originally comes from the steppes of the Ukraine, whence vast numbers of cattle are annually driven westward. Mr. Consul Hertslet reports from Königsberg that rumours of the existence of a cattle plague in Volhynia and Podolia have been current since 1854, and that the disease, having gradually advanced in a northerly and westerly direction, had at length reached the immediate neighbourhood of the Prussian frontiers at Kowno. In a despatch from Berlin, by Lord Bloomfield, ambassador at the Prussian court, dated April 4th, 1857, it is stated, that the steppe murrain had then been imported into Silesia by some cattle from Galicia; but that as the whole of the infected cattle, as well as all such as had come in contact with them, were immediately slaughtered, and the most active measures had been adopted, "there is every reason to hope that its propagation will be prevented, and its extinction secured."

IV.—Preventive Means

In a disease of this contagious character, the obvious means of prevention is to immediately remove the infected animal from all possible contact with others; to destroy all litter and forage left behind; to burn the less-valuable harness or utensils; to scour the place well with chloride of lime; and to forbid those attending on the sick beasts from having anything to do with healthy ones. This would diminish the contagion in virulence and extent; and the use of chloride of lime would, in very many cases, prevent it from spreading.

It is also most proper to have the carcases buried as soon as possible. After such diseases the body runs to decomposition very rapidly, and the neighbourhood of a mass of putrid matter must be prejudicial to health.

I will copy the instructions of boards of health and of government, both in some of the former attacks, and at the present day, as there is no doubt but such instructions contain a summary of the best modes then in vogue.

In 1745, boards of health were, by order of council, established in various parts of England. They were authorized to prevent the sale or removal of cattle from one district to another; to cut off all communication between the healthy and infected parts of the country; to kill every beast that they deemed to be infected; and to see that every beast that died was immediately buried. They were also charged with the institution of certain means of cure, and more particularly of prevention. The following, the first legislative enactment on such matters, may, I think, be compared without disadvantage to the recent orders in council on the same subject:—

First Commission, March 12th, 1745.

"His Majesty being desirous of doing all in his power to put a stop to the spreading of the said distemper, has thought it fit, by and with the advice of his privy council (who have consulted physicians and surgeons thereupon, and they have given it as their opinion that all the methods of cure which have been put in practice, both at home and abroad, have proved so unsuccessful, that they have rather contributed to propagate than stop the infection; for while means have been using to save the sick, the disease spread amongst the sound, and is increasing more and more in proportion to the number seized with it), to make and establish the rules and regulations following, which his Majesty does, by this order of his privy council, requiring and commanding all his subjects, in the several counties, cities, towns, corporations, and parishes, and all parts of his realm, strictly to pursue and observe during his royal pleasure,—

"First. That all cowkeepers, farmers, and owners of any of the said several sorts of cattle, in any place where the said distemper has appeared, or shall hereafter appear, do, as soon as any of the said cattle shall appear to have signs or marks of the said distemper, immediately remove such cattle to some place distant from the rest, and cause the same to be shot or otherwise killed, with as little effusion of blood as may be; and the bodies to be immediately buried with the skins and horns on, at least four feet in depth above the body of the beast so buried, having first cut and slashed the hides thereof from head to tail, and quite round the body, so as to render them of no use.

"Secondly. That they do cause all the hay which such infected cattle have breathed upon, and all the hay, straw, or litter that they have touched or been near, to be forthwith removed and buried; and that no person who shall attend any infected cattle shall go near the sound ones in the same clothes.

"Thirdly. That they do cause the houses or buildings, where such infected cattle have stood, to be cleared from all dung and filth; and wet gunpowder, pitch, tar, or brimstone to be burnt or fired in several parts of such buildings, at the same time keeping in the smoke as much as possible; and that the same be frequently washed with vinegar and warm water; and that no sound cattle be put therein for two months at least.

"Fourthly. That they do not suffer any of their cattle that shall have recovered from the said distemper before the notification of this order to be brought amongst the sound cattle, until they shall have been kept separate a month at least, and until they shall have been well curried and washed with vinegar and warm water.

"Fifthly. That no person whatsoever do buy, sell, or expose for sale, the milk, or any part of the flesh or entrails of any such infected cattle; or feed, or cause to be fed, any hog, calf, lamb, or any other other animal therewith; or drive, or cause to be driven, any such infected cattle to any fair or market, either in or out of the county where the said cattle now are, or to or from any place whatsoever, out of their own respective ground, while they are so distempered.

"Sixthly. That no person do drive or remove any of the said sorts of cattle, whether infected or not infected, from any farm or ground where any such infected cattle are, or shall have been, within the space of one month before such removal.

"Seventhly. That as soon as the distemper shall appear in or amongst any of the said sorts of cattle of any cow-keepers, farmers, or other persons, they do immediately give notice thereof to the constable of the town or parish, and also to the churchwardens or overseers of the parish or place where such infected cattle shall be, of the appearance of such infection, or to any inspector to be appointed by the justices of the peace for the district where such parish or place shall be, pursuant to the directions hereinafter given, to the end that the said officers may be the better enabled to do their duty, according to the directions hereinafter mentioned.

"That no person do presume to obstruct any constable or overseer of the poor, or other person to be appointed by the justices of the peace to assist in the execution of the powers or directions given, or to be given, in pursuance of this order.

"That whosoever shall disobey these said rules, orders, or regulations, shall be strictly prosecuted for the penalties inflicted by the said act.

"And his Majesty does further strictly command all constables, churchwardens, and overseers of the poor, and such inspectors, if any shall be appointed as aforesaid, as soon as they shall know, or be informed, that any of the said sorts of cattle within their respective districts are infected, to go to and take an exact account of the number and sorts of such cattle in the possession of any person, distinguishing the infected from such as are not so; and to repeat those accounts weekly; and to see that the infected be shot, or otherwise killed, as aforesaid, removed and buried, according to the before-mentioned rule; and that all the other before-mentioned rules, orders, and regulations, and such directions as shall be given by the said justices, be punctually performed and obeyed.

"And for the encouragement of the owners of such infected cattle, his Majesty doth hereby promise, that they shall be paid by the commissioners of the treasury, for every such infected beast as shall be killed according to these rules immediately after the infection shall appear upon them, one moiety, or half the value of such cattle, not exceeding the sum of 40*s.* for each of the said sorts, excepting calves, and not exceeding 10*s.* for each calf; the numbers, and values, and conformities to the said rules to be ascertained by the oaths of the owners and two of the said constables, churchwardens, overseers, or inspectors, to be taken before one or two of the said justices, who shall certify under their hands, or the hand of one of them, the sums of money which such owners shall appear to their or his satisfaction to be entitled to, by virtue of this order, for infected beasts shot or killed, slashed and buried, according to the above regulations.

"And it is hereby further decreed, that for the better notifying of this order, the same be forthwith printed and published, and also inserted in the next *London Gazette.*"

I have quoted this enactment entire, as it so fully shows what was then thought necessary; it contains also nearly all the precautions which are now employed in foreign countries, and with success, for the prevention of this disease, and its expulsion when once introduced.

But from not being properly carried out, it appears to have been a failure in England at that time. The boards of health were composed of some of the magistrates of the district, and of physicians who very handsomely proffered their gratuitous services, and they laboured twelve years, and with so little avail, that at length, as it were by a simultaneous act, they dissolved themselves. They could discover no preventive—no cure of the disease—and the restrictions with regard to the sale or the removal of cattle and communications between different districts were so frequently evaded, that it was either impossible or impolitic to levy the penalties.

There was so much caprice about the disease, and beasts so often recovered after all hope had seemed to have passed away, that the farmers resisted the slaughtering of their cattle, or concealed them when they were sick; and, on the other hand, in ridicule of the competence of their judges, they brought all their old and worn-out animals, or those that were ill of totally different complaints, and had them destroyed, and claimed the remuneration which the government allowed for those that were infected with murrain.

Of the propriety, however, of this bonus for the destruction of infected cattle, there cannot be a doubt; for there were numerous instances in which those who began to kill the sick as soon as the distemper appeared among their cattle, lost very few; but others, who would kill none, until their own folly had made them wiser, did not save more than one out of ten.

The Danish government at the present time, by regulations which are precisely similar to those formerly used in England, have, on the other hand, been constantly and repeatedly successful in extirpating the disease, which, however, has always returned when the regulations have been relaxed. The means are, simply cutting off all importation of cattle from districts and countries where the disease is general, and in immediately killing all diseased and suspected cattle in those districts where the disease is just appearing. And by the employment of paid district veterinary surgeons, and paid officials to enforce penalties, the precautionary measures succeed which formerly failed in England, where the carrying out the regulations was intrusted to unpaid justices of the peace and the gratuitous services of local agents. Work to be well done, or even done at all, must be paid for at its value. On the first appearance of the disease in Denmark, in the year 1852, a circular was issued by the authorities, which is still in force, and, in an abridged form, is as follows:—

1st. All suspected cattle are immediately to be separated from the herd, and due notice given to the veterinary surgeon of the district and the parish bailiff.

2nd. If such notices are not given, no claim for compensation is allowed, and a fine of ten to fifty rix-dollars (£1. 2*s*. 6*d*. to £5. 12*s*. 6*d*.) is enforced.

3rd. The affected cattle are at once valued by the proper authorities and killed under the inspection of the veterinary surgeon. Even suspected cattle may be thus treated where there is great danger of the disease spreading. If, on inspection and dissection by the surgeon, the beast is found to have had the disease, two-thirds of the declared value shall be paid the owner; if not diseased, the full value shall be paid. The beast, by order of the surgeon, shall then be buried with skin, entrails, &c., at a depth of three to four feet, at some unfrequented spot.

4th. Beasts ill, yet without lung symptoms, shall for a time be carefully separated from the herd, and placed under the veterinary surgeon's inspection.

5th. Beasts which have had the disease, or have stood and grazed with diseased beasts, are regarded as suspected, are under the veterinary surgeon's inspection, and cannot be considered healthy until twelve weeks have elapsed without the appearance of disease. In cases of a violent attack, eighteen weeks' quarantine are necessary.

6th. Every stall where diseased or suspected beasts have stood, also all articles suspected to retain the infection, must be carefully cleansed with boiling water under the inspection of the veterinary surgeon, and then repeatedly rinsed with a mixture of chloride of lime and water, or be subjected to the influence of steam from chloride of lime. All iron-work must be made red hot. Such places and articles must not be used till six weeks after cleansing. Attendants on the diseased and suspected must not approach healthy cattle; but where this is unavoidable, the instructions of the veterinary surgeon must be followed scrupulously.

7th. Grass lands on which diseased or suspected beasts have grazed must not be used by healthy cattle till the expiration of six weeks. Fodder exposed to infection must be given to sheep and horses, not to cattle.

8th. All fences and ditches round fields where diseased or suspected cattle have stood must be carefully maintained, to prevent infection; and if they adjoin roads, means must be taken to prevent the cattle getting within a distance of twenty-five feet. Suspected cattle must not be driven upon public roads; their removal should, if possible, be avoided, and a fold be erected for them in the field.

9th. Bulls which have served cows in suspected herds must not be allowed access to healthy herds.

10th. The sale of infected beasts is not allowed. That of suspected only by written permission of the authorities, and under strict observance of the precautionary measures given them.

Infringement of the regulations will be visited by fines of from ten to one hundred rix-dollars (£1. 2*s.* 6*d.* to £11. 5*s.*).

Such are the methods found effectual in Germany and Denmark. They would probably be thought too great an infringement on private rights, and too obstructive of the trade in cattle, to be popular in England; but they must be employed in case the disease becomes general.

The danger of the introduction of the disease from foreign countries is great, as nearly one-fifth of the number of horned cattle sold in the London cattle-market during 1855 and 1856 were from the continent. But every reasonable precaution appears to be already in operation. The Commissioners of her Majesty's Customs have appointed duly-qualified veterinary surgeons at the chief ports of importation, to examine all cattle coming from foreign ports previous to their admission into this country; and where no permanent inspector is appointed, the collector for the port is authorized to employ a veterinary surgeon to inspect, which is to be done as soon as possible after the arrival of the vessel importing cattle.

By printed instructions of 24th December, 1856, dated from the Custom-house, London, it is directed, that "after the cattle, sheep, lambs, or pigs have been landed, they are to be kept in charge until each animal has undergone a careful examination, and if found free from disease, the whole are to be passed immediately; but in the event of any disease being found to exist, such of them as may be so diseased are to be immediately killed, if the same be considered necessary by the veterinary surgeon; and if, upon a *post-mortem* examination of such cattle, sheep, lambs, or pigs, the same be found fit for human consumption, they, and the rest of the importation, are to be delivered to the owner or owners thereof; but should any of those so examined be unfit for such purpose, and the disease be of an epidemic or contagious character, they are to be buried, or effectually destroyed in the presence of an officer, and the remainder of the importation detained for further examination so long as the veterinary surgeon may deem necessary."

That these instructions have been carefully carried out in the port of London is proved both by the remonstrances of importers of cattle, both to the Board of Trade and Commissioners of Customs, and also by the fact that Mr. Nice, veterinary surgeon, inspector of live cattle at the Metropolitan Cattle-market, states that he has not found reason to seize or detain, on account of disease, a single animal among the many thousands of foreign horned cattle exposed for sale.

In addition to the precautions against the lung disease, as soon as it was known that the more virulent steppe murrain, or *rinderpest*, had reached Kowno, and other places in the vicinity of the Russian frontier, an order in council was issued, prohibiting the importation of cattle, and of horns, hoofs, raw or wet hides, or skins of cattle, into the United Kingdom, from any port in the Baltic east of Denmark. It was also ordered that no cattle, and no articles supposed to be capable of conveying infection, as horns, hoofs, raw hides, hay, straw, fodder, litter, or manure, should be admitted into the United Kingdom, which had been on board any vessel coming from one of the interdicted ports, and that if any such vessel or prohibited articles shall be brought to this country, they shall, upon their arrival here, be destroyed, or otherwise disposed of as the Commissioners of her Majesty's Customs may direct. The Danish Government has issued a similar order, applicable to the same ports, that the cattle trade between Denmark and England may not be disturbed.

Our real protection against steppe murrain consists,—1st, in the energetic means adopted by intermediate states, to secure the exclusion of the murrain from their territories; 2nd, in our insular position, and in the length of the transit from those countries into the United Kingdom.

In Prussia, for example, all direct traffic over the frontier from infected places is forbidden, the importation of cattle and other articles likely to convey the contagion being entirely prohibited, and butchers and other persons suspected of having had intercourse with cattle being compelled to undergo quarantine. When the disease has appeared in the Prussian territories, in spite of these precautions, the infected place is surrounded by military, no intercourse whatever being allowed. All oxen, cows, and calves are killed, and buried with quicklime in deep pits. Thus, it appears, that though in the steppes of the Ukraine, in Volhynia and Podolia, the disease of steppe murrain exists, is originated, and, at intervals, breaks out with virulence, yet that, for their own sake, the Austrians and Prussians take precautions to prevent its introduction into their territories, or ensure its speedy extirpation if introduced. Therefore, although it is right to take proper precautions, fears for its introduction to England from Denmark, Prussia, or Germany appear to be groundless.

Amongst the greatest aids of prevention, Mr. Youatt mentions the establishment of veterinary schools as having been one means of the extinction of the disease in the attack of a century ago. Doubtless these are most beneficial, but it must not be forgotten that the disease was declining in England and the Continent in 1758, and the first European veterinary school was not established till 1761, at Lyons, under the superintendence of the justly celebrated Boargelat.

"Partly," says Mr. Youatt, "from natural causes, the disease beginning, as we have hinted, to wear itself out in France—but, to a considerable degree, from the diligence and skill of the professors—the ravages of the epidemic were evidently and quickly restrained; and though it could never be said to have quite disappeared, either in France or elsewhere, and is yet occasionally far too fatal, yet its victims are, comparatively speaking, few, and it is deprived of most of its terrors. This altered character and decreased devastation of every subsequent epidemic, must be traced mainly to one cause,—the preventive or curative measures suggested by veterinarians, and the former perhaps much more than the latter."

Thus wrote Mr. Youatt, when the epidemic was dormant here and on the Continent. His statement shows how apt we are in the pride of human knowledge to look upon a remission of disease as the result of our science and skill; but let epidemics approach with all their original virus — whether the cholera in man, the murrain in beasts, the disease in potatoes—and then it is seen how utterly powerless we are to stay the general affliction, in spite of our boasts, and of our conceded advance in scientific knowledge.

Doubtless the establishment of veterinary schools is a desideratum. In the case of the one at Lyons, it was attended by young men from every province in France, and almost every country in Europe. A second school was established four years afterwards at Alfort, and, in process of time, a third at Toulouse.

Other governments followed the example of France, with great beneficial effects in mitigating and curing all diseases of horses and cattle. Last of all (strange that it should be so), England established her veterinary school, to study the art of preserving the health of all domestic animals, and cattle principally. But unfortunately the college was established too near the metropolis, and, as at Alfort near Paris, in spite of all regulations, the situation induced horses and their diseases to be almost exclusively attended to. Thus the pupils were (in the time of Mr. Youatt) sent where they would have the ox and sheep for their patients, without any knowledge of the maladies of either.

Mr. Youatt complains that boards of agriculture and English agricultural societies have neglected the veterinary art, and praises the Highland Society for establishing a veterinary school at Edinburgh, from the effect of which he traces the increased value of Scottish cattle. But his reproach is unnecessary now that the English Veterinary College is equal to any, and when the Royal Agricultural Society has expended far more than the British government in investigating the causes and cure of the small-pox in sheep, and the murrain in cattle.

The improved value of Scotch cattle is more properly due to the infusion of English blood, to the greater care in breeding, and to the increased facilities by steam for exporting to England for sale, than to the formation of one veterinary school, however well conducted.

V.—CURATIVE MEANS.

The means employed in the attack in 1750 were so unsuccessful that it is almost useless to refer to them, except to show the contradictory nature of the treatment. Some scientific men maintained that it was an inflammatory fever, and others that it was a bilious fever, and each defended his theory with so much warmth and obstinacy, that the simple farmer was first puzzled and then disgusted; and there were also such different modes of treatment recommended—drugs both for prevention and cure, which either had never been used for the diseases of cattle, or had been proved, even by the beast-leeches of the day, to be perfectly inert in the ruminant; and all evidently founded on conjecture and hypothesis, and borrowing nothing from experience,—that, in the language of Dr. Davies, "the graziers found more recover when left to themselves than when tampered with, and that nature was a better director than an officious pretender."

Dr. Layard gives a very curious account of the matter. Disappointed in their hopes from regular practitioners of physic, they (the farmers) despised all regular methods, and ran headlong after such remedies as were at once to remove every complaint, and were honoured by the authors with the ever-recommending title of *infallibles*. Nor were these remedies more efficacious: tar water, Bateman's drops, Godfrey's cordial, worm powders, and many other things were all given, and all to no purpose; until, bewildered in a labyrinth of opinions, and distracted through their absurd credulity, they became as superstitious in this case for their beasts as fatalists are with regard to themselves. They would only bleed and give milk-pottage, because they believed these things innocent; and when, by loss of blood or scouring, the cattle died, they said that they left the whole to Providence. If they were cured they said it was well; if they died they said no one knew anything of the matter, nor could anything have done them good. But as in England the precautionary measures of 1745 seem to have forestalled those of Denmark, &c., in 1852, so the supposed curative measure of the Continent—that of inoculation—was invented just 100 years back in England.

Sir W. St. Quentin, of Scrampton, in Yorkshire, the Rev. Dr. Fountaine, dean of York, and other gentlemen, recommended and successfully practised it. The inoculation was performed with matter taken from the running of the mouth, nose, and eyes. Eight calves were inoculated by the first gentleman, seven of which had the distemper and recovered, and were afterwards turned into a herd of infected cattle without being diseased a second time. An old ox, also inoculated and recovered, was turned into a herd of infected cattle, and continued on the pasture with them until they were all dead; he was then put with another herd of infected cattle, but still escaped.

Dr. Layard produces some singular testimonies to this effect. He speaks of one farmer who had eight cows that survived the distemper in 1746, and which, when the disease was again among his stock in 1749, 1755, and 1756, were in the midst of the sick cattle, lay with them in the same barns, ate of the same fodder, and even of such as the distempered beasts had left and slavered upon, drank after them, and constantly received their breath and steam, without being in the least affected. The farmers were so assured of this that they were always ready to give an advanced price for those who recovered. This last opinion is held at the present day by a majority of cattle breeders.

But Mr. Greenhow considers that the success of Sir W. St. Quentin arose from there being two distinct kinds of murrain then ravaging England, and that the cases described by Layard were the steppe murrain, or *rinder-pest*, which last can occur only once in the same animal, and is communicable by means of inoculation. Inoculation could hardly be expected to answer in any but a specific febrile disease; and as steppe murrain is of this description, it is quite possible that inoculation may be successful in this, and yet fail in pulmonary murrain.

The practice of inoculation in the ox was re-introduced in 1852 for *pleuro-pneumonia*, by Dr. Willems, a physician of Hasselt, in Belgium. The matter employed by Dr. Willems consists of the liquid pressed from the lungs of an animal recently slaughtered, or of one that has died of this disease. The matter for inoculation should, according to Dr. Willems, be taken from an animal suffering from the early stage of the disease, and in preference from a portion of lung in which the disease is least advanced; for the use of liquid from the lungs in an advanced stage of disease is, he says, liable to be succeeded by more violent local symptoms. The operation is performed upon the tail, near its extremity, and is followed after an uncertain interval, varying from a few days to thirty, by tenderness, swelling, inflammation, and induration of the wound and its neighbourhood. Sloughing and mortification are very common consequences of the operation, and frequently a portion, sometimes the whole, of the tail is lost. In rarer, but still not very unfrequent instances, the sloughing extends to the perinæum and adjoining organs, producing death after a period of much suffering, unless the animal be timely slaughtered. The local consequences of inoculation have occasionally lasted two or three months. Dr. Willems asserts that an excessively abundant exudation, analogous to that occurring in the lungs of diseased animals, takes place in the swollen region immediately around the point of inoculation.

The liquid from the diseased lung is stated by the advocates of this measure to act as a specific virus, neither blood nor any other matter acting in a similar manner, influencing the whole system, and rendering it unapt to contract pulmonary murrain. The virus only affects the bovine race, other animals experiencing no specific effect. It is also asserted that inoculation never affects the lungs, as in the original disease; but when death by this process is fatal, it is caused by the extension of the local disease to other organs.

Yet, as Mr. Greenhow observes, this last fact seems to prove no real inoculation is effected; for in the case of small-pox in man, whether inhaled by the breath, or induced by a lancet, the seat of the consequent local affection is precisely the same. With other contagious diseases, and with poisons, the case is similar. However introduced, arsenic affects the stomach and cantharides the kidneys.

In fact, if inoculation has ever been of use in pulmonary murrain, its action has resembled that of an issue, and the immunity produced by it may be compared to the alleged immunity of persons who have chronic discharges from the contagion of plague; and thus, from the first attacks of the murrain, setons and issues have frequently been recommended as preventives or curatives.

With the view of testing the value of inoculation, several continental governments appointed special commissioners; and as the reports of two of these—the Belgian and the Dutch—were presented to the House of Commons by command of her Majesty, in pursuance of an order of the House, dated December 6th, 1852, I quote briefly from each of these. The Belgian commissioners report, that though Dr. Willems had operated on 1,142 animals (including his father's) before the end of 1852, with the result of only six being subsequently attacked, yet, that as all the cattle at his place of abode, Hasselt (with the exception of three), had been, and were, in perfect health when the committee inspected them, and as inoculation had then been tried only for six or seven months, no conclusions could be drawn as to its efficacy.

On the other hand, many facts seemed to prove that inoculation caused a greater loss of cattle than the disease itself. Of 132 successfully inoculated animals, seven, or more than five per cent. died of the disease within eight weeks of the operation, being just one-half the estimated average loss before the introduction of the so-called preservative. Besides which, ten animals died from the local mischief caused by the operation. The Belgian commissioners report that of 4,324 animals successfully inoculated, eighty-six died from the consequences of the operation, and seventy-three subsequently contracted pulmonary murrain. However, it is added, more than half the inoculations were performed at or near Hasselt, where the disease had begun to subside, and the same proportion of animals operated on consisted of fat stock, which are well known to be liable to disease.

Nor does the result of some experiments performed in this country by Mr. Simonds, at the request of the Royal Agricultural Society, afford any support to the opinion that inoculation either produces the specific disease, or serves as a preservative from pulmonary murrain. Mr. Simonds found the local result of the inoculation to be only "ordinary inflammation, advancing with greater or less rapidity to suppuration." He also observed the same local consequences to arise from repeated inoculations on the same subject; to be produced by medicinal irritants almost as much as by the liquid taken from the lungs of diseased animals; and to follow the inoculation of sheep, pigs, and a dog, as well as that of horned cattle. The last fact especially is directly opposed to Dr. Willems's assertion, that the bovine race alone are influenced by the so-called virus, and also to his belief that the local disease produced by inoculation is of a specific character; for pulmonary murrain is generally considered as peculiar to the ox. Finally, out of a herd of 100 animals belonging to Mr. Paget, of Ruddington Grange, near Nottingham, that were inoculated under Mr. Simonds's directions, six that had been successfully inoculated became the subjects of pulmonary murrain within a few months.

The evidence on the practice of inoculation cannot be better or more impartially summed up than by adopting the cautious conclusions of the Belgian commissioners—"That inoculation with the liquid extracted from a lung hepatized in consequence of pleuro-pneumonia is not an absolute preservative against that disease; that the pneumonia succeeding inoculation may occur several times upon the same animal, whether it has or has not been affected with exudative pleuro-pneumonia; and that the two affections may go on simultaneously in one and the same individual." If these conclusions are correct, inoculation, from the suffering it causes the animals, and the losses resulting from Dr. Willems's process, is at once a useless and a cruel proceeding.

Although, on the continent, precautionary measures and police regulations are considered far more efficacious than any curative means, it may be advisable, as the continental practitioners have had very much more experience than the English, to quote what is there considered the best means of treating these diseases in their several varieties. And I therefore slightly abridge the account forwarded by the *Times* Vienna correspondent, printed April 22nd, 1857, in that paper.

On the outbreak of catarrhal affection of the lungs, those medicines which tend to reduce inflammation, or the activity of the vital power, are always employed in Austria. The ailing animals must be kept at home in a warm, airy, clean stall, and an electuary with small doses of salt and gentian, or wormwood, administered three or four times a-day. The backs of the animals must be washed with warm water, and rubbed quite dry with wisps of straw. The food must be some green meat, easy of digestion, or good hay; the drink some mucilaginous fluid, which has been allowed to stand in a warm place. As soon as the alvine discharge has become more plentiful, and the respiration freer, the quantity of salt must be diminished, and elecampane powder, fennel, sulphur, and a few drops of oil of turpentine added to the electuary. The turpentine acts on the kidneys, and increases the secretion of urine. Good hay, with oatmeal, and now and then a dose of the above-mentioned medicine, must be given for a few days after the catarrhal affection of the lungs has ceased. If there is any tendency to putrid catarrhal fever, care must be taken to prevent too great an accumulation of food in the stomach, the digestion must be aided, and the skin excited to action. The sick animal must be fed with scalded hay, potatoes, horse-chesnuts, and dosed with aromatic and balsamic medicines, combined with camphor. If the inflammation is very severe, and the breathing greatly oppressed, blood may be taken in moderate quantities, and mild purgatives given. At the outbreak of malignant and catarrhal fever, and more particularly if there is a determination of blood to the head, bleeding in the neck is absolutely necessary. Poultices made of common salt, vinegar, and clay, may be applied to the head and neck, and the whole body washed with vinegar, or strong lye. If there is obstinate constipation, injections of salt or soap must be given. The internal remedies employed are several doses of saltpetre, each consisting of half an ounce, which must be given every two or three hours. If doses, each consisting of two or three ounces of salt with half a drachm of tartar emetic, are subsequently administered, a marked improvement will, in general, take place in two or three days. If, however, the malady make further progress, and the animal lose strength rapidly, tonic remedies must be employed, and particularly the sweet spirits of nitre (*spirit. nitri. dulc.*). If there is a great looseness, columbo-root with opium, and small doses of rhubarb, must be given. If any typhoid symptoms should be observed, camphor and balsamic medicines may be tried; "but if malignant catarrhal affection of the lungs is in its third stage, hardly one animal out of ten can be saved."

The "lung disease," combined with typhus, is more contagious, and of a more fatal character, than the last. "If," says a learned and skilful veterinary professor, "the lung disease, combined with typhus, is to be cured, it must be attacked while the animal has its full strength and vigour." If the patient, being of robust constitution and of middle age, has, at the beginning of the malady, a violent and dry cough, and fiery and inflamed eyes, from five to eight pounds of blood must be taken without loss of time. If the violence of the symptoms does not abate, the venesection may be repeated; but proper attention must always be paid to the constitution and age of the animal. In all cases a mixture of turpentine, laurel oil, and cantharides powder must be rubbed in behind and below the shoulder-blades, and a seton be employed, anointed with the same salve. M. Fey recommends that the whole of the back, from the neck downwards, should be rubbed with an ointment composed of turpentine oil and laurel oil, of each an ounce and a half, and of strong spirits of sal-ammonia, spirits of camphor, and powdered Spanish flies, of each half an ounce. Before the salve is applied the whole body should be well brushed or rubbed for half an hour. To clear the bowels, clysters, composed of three or four ounces of common salt and camomile tea, should be given every two or three hours. Mashes, with saltpetre, sal-ammonia, and flowers of sulphur in them, may also be given. Some years ago, a M. Merk asserted that a decoction of hemlock was a specific against the complaint; but the Vienna practitioners of the present day are not of this opinion. If the complaint is in the second stage, camphor, valerian, assafœtida, sulphur, and sulphuret of potash must be used. Should an improvement take place, less powerful medicines must be gradually substituted for those last mentioned. If, on the contrary, such unfavourable symptoms as difficult respiration, violent cough, increasing emaciation, &c., continue for some time, the animal had better be killed, as the first loss will be the least.

The *loser-durre*, or *rinder-pest*, is considered incurable, or so nearly so that the most economical mode is to kill every beast affected by it. The *loser*, or third stomach of cattle, which die of the real or steppe murrain, is invariably diseased. On the outside, it is generally covered with livid spots; and in the inside is found ruminated food, not in a pulpy mass, as it ought to be, but in the form of a dry, dark green, coarse powder, which is found in between the leaves of the *loser*; indeed, the very word *loser-durre*, means dryness of the third stomach. The fourth stomach is always either highly inflamed, or gangrenous.

During the Russo-Turkish war of 1827 and 1828, Russian herds driven into Silesia brought the murrain with them, which carried off 30,000 head of cattle in Hungary, 12,000 in Galicia, and 9,000 in Moravia. According to a very moderate estimate made by M. Faust, the steppe murrain had, at the end of the last century, carried off twenty-eight millions of cattle in Germany.

This account is interesting, but an English practitioner will hardly gain more than "hints" for his practice from it; as no great success is reported to attend the medicines given, many of which are confessedly nearly, if not quite, inefficacious.

Mr. Youatt gives a first-rate sketch of the mode which ought to be adopted; but he has generalized so much that it is of less use to the agriculturalist than the practitioner. I have therefore added a recipe, as recommended by Lord

Cottenham (in a recent letter to a morning paper), as having been successfully employed by him for many years. The recipe was drawn up by Mr. Ridgway, of Fairlawn, in Kent. As in the Austrian recipes, sulphur, spirits of turpentine, and emetic tartar are employed at different stages; but the English recipes are much the least complicated.

Pleuro-pneumonia.

Epsom salts	1 lb.
Sulphur	3 oz.
Ginger	½ oz.
Spirits of turpentine	3 table-spoonfuls.

If it does not act freely in three hours, repeat the dose: when it has acted freely, give,—

Powdered nitre	3 drachms.
Emetic tartar	1 drachm.
Digitalis	½ drachm.
Nitrous ether	3 table-spoonfuls.

And give two quarts of gruel three times a day.

Mr. Youatt says,—"The treatment of this disease is most unsatisfactory. If the farmer could be brought to attend more to the cough in cattle,—if, here, he had recognized the violent and increasing cough,—and although he had not dreamed of murrain, had bled and physicked the beast on account of the cough, the disease would probably have been arrested, or, at least, its virulence would have abated.

"The early stage, even of murrain, is one of fever; and the treatment should correspond with this—bleeding. Physic should be cautiously, yet not timorously, resorted to. For sedative medicines there will rarely be room, except the cough should continue. Small doses of purgative medicine, with more of the aromatic than we generally add, will be serviceable, effecting the present purpose, and not hastening or increasing the debility which generally is at hand; but if the bowels are sufficiently open, or diarrhœa should threaten, and yet symptoms of fever should be apparent, no purgative must be given, but the sedatives must be mingled with some vegetable tonic. The peculiar fœtid diarrhœa must be met with astringents, mingled also with vegetable tonics. In combating the pustular and sloughing gangrenous stage, the chloride of lime will be the best external application; while a little of it administered with the other medicines inwardly, may possibly lessen the tendency to general decomposition. The external application of it should not be confined to the ulcerated parts alone; but it should be plentifully sprinkled over and about the beast."

But the most scientific and the most successful mode of treating pulmonary murrain is that of Mr. Horsfall, as reported by him in his "Essay on Dairy Management," in the "Royal Agricultural Society's Journal," vol. xviii. p. 150.

He says,—"The first appearance which arrests the feeder's attention is, loss, or partial loss, of appetite. If, on examination, I detect any of the symptoms which characterize pleuro, viz., cough, quickness or deepness of respiration, loss of cud, and acceleration of pulse, intermittent warmth and chillness of horns and feet, I proceed at once to bleed till the pulse is sensibly affected; this requires usually five or six quarts to be taken. I then give,—

Epsom salts	8 oz.
Sweet spirits of nitre	1 oz.
Tartar emetic	½ drachm.
Digitalis	½ drachm.
Flour of sulphur	4 to 6 oz.
Treacle	16 oz.
Cocoa olein	6 oz.

"These ingredients are mixed, and given in plenty of warm gruel, for which I use boiled Indian meal, with one-fourth proportion of pea meal. On a renewal of the difficulty of breathing, or acceleration of pulse, I repeat the bleeding to a less degree—say three quarts—and give likewise the tartar emetic and digitalis in the gruel.

"I continue to give, morning and evening, in gruel,—

Sweet spirits of nitre	½ to 1 oz.
Flour of sulphur	4 oz.
Treacle or sugar	8 oz.
Cocoa olein	4 to 6 oz.

"At noon I give gruel, with addition of a little sugar only. The doses of treacle and sulphur are modified so as to keep the bowels moderately open. It will be observed that I give Epsom salts as the first dose, on account of their quick action; but afterwards I prefer treacle with sulphur. The patient requires watching with the greatest care. The sick room ought to be well ventilated at the top, but kept warm day and night; a depressing temperature, or a draught, has been observed to disturb the breathing. When the feverish symptoms have abated, I give oatmeal instead of Indian meal in the gruel. I continue the cocoa olein in the gruel throughout, with doses of half an ounce to one ounce sweet nitre, and three to four ounces of flour of sulphur. In several cases, when the pulse has become feeble, and below sixty beats per minute, accompanied by weakness and languor, I have given a wine-glassful of brandy in the morning's and evening's gruel with apparent advantage. The attendant is instructed to offer the animal change of food,—brewers' grains, bran-mash, a little hay, grass, green rape-plants, or other palatable material. It is encouraging to find the animal begin to eat, and make its selection of food."

Mr. Horsfall states, that since he has used the precise treatment he thus describes, upwards of twenty cattle in succession (his own and neighbours') have recovered; and he only lost two on first commencing his experiments.

The time the cattle have been unwell has ordinarily varied from fourteen to twenty-one days; some have exceeded this. The healthy action of the skin is stimulated; the animals continue to lick themselves with little intermission throughout; they likewise retain, or otherwise resume, their cud, under conditions I should not have expected: frequently when supplied only with the gruel and its ingredients, with not more than a pound or two of hay per day, I have observed them cudding.

They have lost in live weight 1¼ cwt. to 1¾ cwt. A considerable portion of this will doubtless be in bulk from the use of the purgative medicines. The milk cows whilst suffering, have reduced their yield of milk from two to four quarts per day; but on recovery have almost wholly regained their former quantity. In no instance have I found a greater diminution than what might have been expected from the loss of condition and of time.

The cocoa olein is prepared in Messrs. Price and Co.'s candle manufactory, expressly for cattle, being lower in price than what is used for medical practitioners.

The *rationale* of the treatment is this. Bleeding is employed at first to subdue the fever, and reduce the circulation. Tartar emetic and digitalis also retard the circulation, and lower the pulse. Spirits of nitre and flowers of sulphur stimulate the secretions, and tend to purify the blood and the system; these are, therefore, continued much longer. And as the more frequent respiration and want of appetite leads to a waste of the fatty portions of the body, foods rich in heat, carbon, and nitrogen, are given. Indian meal is peculiarly rich in starch; by the process of boiling it approximates more nearly to sugar. Sugar and treacle are also given; and olive oil has the same beneficial effect on animals, in diseases of the lungs, as cod-liver oil on the human race.

VI.—ARE THE FLESH AND MILK OF DISEASED ANIMALS INJURIOUS?

This question as to whether the flesh and milk of diseased cattle is injurious, and whether such are often partaken of, is a most important one.

With respect to the flesh. As the real pulmonary disease hepatizes or solidifies the lungs, filling up the air-cells, producing a marbled appearance when cut, and increasing the weight of the lung to double or even treble the original, so that it even sinks in water,—the lungs being, in the first instance, the seat of the disease, the flesh is considered fit for food if the animal is killed in the first stage. This appears the universal opinion. In the attack of 1750, Dr. Brocklesby relates a story of a countryman who had often solicited a butcher to give him a beef-steak; at length the butcher, tired with the fellow's importunities, determined to satisfy his desire, and presented him with a large slice of meat from a beast that had died of murrain. The clown was thankful enough, and soon afterwards returned with fresh solicitations for such another steak. After three weeks had elapsed, the man was pointed out to Dr. Brocklesby, and was apparently in perfect health; but he certainly did not know what kind of meat he had eaten.

The practice of the continent may be some rule to ourselves. In Austria, the flesh of the animal is considered innocuous in the first stage of the complaint; at the beginning of the second the sale of the meat is not prohibited, but no one is allowed to kill and sell the flesh of cattle which have reached the third stage of the malady.

In Denmark, the following resolutions were come to respecting the sale of diseased meat at Altbülk:—

1st. The flesh shall be salted at once, and laid in well-closed tubs.

2ndly. The flesh must not be used until the professor appointed shall have inspected and declared it fit for human food. A special payment shall be agreed upon for the hide and tallow of the beasts whose flesh cannot be eaten.

3rdly. The hides shall be salted on the spot, and sent to the tanners in closed tubs.

4thly. The slaughtering and the curing of the meat, &c., shall be effected as soon as possible after closing of the bargain, and at latest within fourteen days. The buyer shall defray all expenses.

5thly. The persons who have been employed at the slaughtering, the curing of the meat, &c., shall change their clothes when they leave the place where these processes are performed.

With respect to the sale of diseased animals for human food in England, there is no doubt that here, as well as on the continent, it is customary to sell animals affected with pulmonary murrain usually before they manifest any appearance of illness, or the disease has materially lessened their value. The London cowkeepers unhesitatingly admitted this fact. It is probable that these cattle are hardly ever in an advanced state of disease, or they would be unable to bear the fatigue of the journey. The inspectors of the Metropolitan Live Cattle Market, and of the slaughter-houses and markets in the city of London, say, they do not feel justified in seizing animals suffering from an early stage of lung disease, or in preventing the sale of meat because the animal from which it was procured had had the disease, provided the meat looks healthy. Mr. Fisher, inspector of meat and slaughter-houses for the city of London, a most competent authority, says, that much of the meat from animals that have had pulmonary disease, is of first-rate quality; and the experiences of all medical men agree that the fleshy parts of bodies are not materially affected by a brief acute illness. Mr. Nice, veterinary surgeon, inspector of the Live Cattle Market, reports that during the last year he has only found it necessary to seize some six or seven horned cattle, of which not one was foreign; thus proving the efficacy of the precautions taken by the inspectors of the Board of Customs in this country.

At a later period of the disease, when emaciation has taken place, and especially if general dropsy has supervened as a consequence of the pulmonary affection, the animals are seized, if taken to market; or, if privately slaughtered, the meat is seized when exposed for sale. All meat taken in the city markets as unfit for human consumption, is sent to the melters and there destroyed.

But the diseased cattle sold in the London public market forms but a very small portion of that really consumed. Many cattle are sent direct to the slaughter-houses, and a much larger proportion is purchased by persons who go from one cattle-shed to another for the purpose of buying up sick cattle.

In addition to the diseased cattle, much diseased meat is brought, ready dressed for sale, to London. In the last forty years to 1850, the number of salesmen in Newgate Market has increased from thirteen to two hundred; the amount sold being 800 tons a week, the sale of dead meat having more than doubled, and of country-slain meat, quadrupled. And no doubt with the increase of dead meat there has been a similar increase of diseased meat. As an instance of the mode in which it was sent up, Mr. Harper, in 1850, stated that, "There are three insurance offices in London in which graziers can insure their beasts from disease: it was the practice of one of these offices to send the insured animals dying from disease to their own slaughter-houses, situated 160 miles from London, to be dressed and sent to the London markets." "The diseased animals when dead become the property of the insurance company, the party insuring receiving two-thirds of the value of the animal, and one-third of the salvage; or, in other words, one-third of the amount the beast is sold for when dead." He added, in reply to another question, that the meat was no longer consigned to salesmen in Newgate Market, but sold more privately "in the slaughter-houses and private places out of the city."

It is often impossible to distinguish the meat of diseased from healthy animals, except when long-standing chronic disease causes paleness of flesh, or general dropsy. And a much greater quantity of diseased and inferior meat is sold in a manufactured form, than is disposed of as joints for cooking.

Mr. Fisher says that such of the diseased cows as are too bad for sale as meat, are chopped up to make German sausages and saveloys. Even putrid, or, at least, tainted, meat is said to be made available for the same purpose, pyroligneous acid being employed to remove the smell. Mr. Harper, in the evidence before the Smithfield Market Commissioners already referred to, says that a great deal of diseased and bad meat is purchased by the soup-shop proprietors, sausage-makers, the à-la-mode beef, meat-pie shops, and the manufacturers of polonies. He referred to one soup-shop as "doing £500 a week in diseased meat;" adding, "this firm has a large foreign trade." The price proves that the sausages sold to the poorer classes must be made of this kind of meat. Beef sausages are commonly retailed at 4½*d.* to 5*d.* per lb., which is far below cost price of good meat.

The returns of meat seized by the city inspectors as unfit for food include the three following classes, which are not distinguished from each other in the returns:—1. Diseased meat; 2. Putrid meat; and, 3. Physic meat.

Under the first head, only such meat as is derived from animals in an advanced stage of disease is included. The flesh of animals dying under accidental violence, or from other obviously local causes, is not seized. It is considered as an inferior kind of meat, looks less fair than such as has been properly slaughtered, and is liable to putrefy sooner, but not being believed to be unwholesome, is permitted to be sold.

Putrid, or even tainted, meat is invariably seized, and, Mr. Fisher states, forms by far the largest proportion.

Physic meat is also invariably seized. It is meat derived from animals that have taken medicine in sufficient quantity to impregnate the flesh with its odour. Some judgment is often required to decide whether the smell is from medicine or food, certain kinds of food, such as turnips, tainting the flesh with their special smell.

The Effect on Human Health of such diseased Flesh, &c. —There is no evidence that the flesh of animals in the first stage of pulmonary murrain is injurious. With respect to other diseases, opinions vary much. Some deny the production of any injurious result; others state that its use is unwholesome; while a third party assert that no bad consequences follow the use of such food, if thoroughly cooked. This last appears the most correct idea, although one must modify it by stating that a few diseases unknown in England render flesh dangerous, and even occasionally fatal, to the consumers; and that injurious effects might be produced not only by diseased, but by excessively fat meat, on constitutions debilitated or predisposed to disease. It must be recollected that flesh of animals suffering from murrain and other diseases, decomposes more rapidly than that of healthy cattle; so much so, that Dr. Brocklesby (in the attack of 1750) recommended meat to be kept three or four days without being salted, as a test of its wholesomeness. "If it remains so long in temperate weather without tainting, there is good reason to consider it wholesome." Still, if such meat is eaten early enough, it is probably wholesome; and the flesh of over-driven oxen is as apt to undergo rapid decomposition as that of diseased.

The flesh is frequently less nutritious, and especially when anasarca (dropsy) has occurred, or when the aspect is materially altered; and in these latter cases the meat is seized by inspectors in London, and it is to be desired that a similar system of inspection should be extended to the provinces. Probably such a system of slaughter-house visitation as provided for the general inspection of all animals, either before being killed, or at least prior to the removal of the viscera, would be the most effectual mode of checking the sale of meat derived from animals in an advanced stage of disease. But it does not appear requisite to prevent the sale of meat from animals in an early stage of such diseases as are usually met with in England, the sale of the diseased organs themselves being of course excepted.

With reference again to foreign authorities on the subject, M. Payen, a recent French writer on food, says it is proved by experience that the flesh of diseased animals, even when they have suffered from contagious complaints, may be consumed by man or animals without producing any deleterious effect. Baron Liebig says that the poisonous matter of the contagious fever of cattle (*i. e.* steppe murrain) loses its power of contagion in the stomach.

Large numbers of oxen and cows, suffering from a typhous epidemic, followed the allied armies to Paris in 1814. The entire population of Paris and the suburbs, including the troops that surrounded and occupied the capital, fed upon the meat of the diseased animals for two months, without any increased amount of sickness of the production of any epidemic disease. None, even of the animals that died, were lost.

A class, called *Chummars*, natives of Hindostan, live upon diseased meat, and are, notwithstanding, a remarkably healthy race, suffering no particular sickness attributable to their eating tainted meat, but chiefly from intermittent fevers and diseases of the climate, and from the effects of excessive drinking. They say they will eat any fish, flesh, or fowl that dies, of whatever nature, only let them cook it their own way. M. Soumille, of Avignon, in a recently published prize essay, says that the consumption of diseased meat may be permitted without danger of health, where there is neither emaciation nor paleness of flesh.

But the *milz-brand*, or carbuncular murrain, is an exception. This disease differs from both steppe and pulmonary murrain, in being communicable to man and many of the lower animals during life. There is also no doubt that handling the carcase after death is very liable indeed to be the means of infection, and that tanners, butchers, and others have, in consequence, often suffered from this very fatal disease. Some authorities consider the flesh harmless when cooked, but Heussinger estimates the annual deaths in Germany from *milz-brand* whether produced by eating the flesh, or by immediate contact with the disease, at from two to three hundred; and says it is still more fatal in Italy, Hungary, and Russia. Thousands of men, he says, annually die of this disease in Europe.

Neither this carbuncular murrain, nor the following American cattle disease, is known in England. From investigations there made in 1843, by Drs. Post, Hosack, and Chilton, of New York, it appears that a disease exists in the districts of Indiana, Illinois, and the western states north of the Mississippi, "which has long been known to exert a deleterious influence on all individuals of the human race who have consumed either the flesh, the milk, or the butter of these animals. . . . In the early settlement of the country, the existence of this scourge in any given locality was frequently sufficient to break up many a community that was, in other respects, most advantageously situated. The condition on which many large settlements exist *at the present day* is, entire abstinence from the flesh of their cattle, as well as the *milk*, butter, and cheese made in their own district of country." And it is probably the result of feeding on particular plants, for the milk and flesh often possess poisonous properties, while the animal itself enjoys good health; it also appears from this that the milk and its products may be equally unwholesome as the flesh.

With reference to the milk from cows affected with murrain, although no doubt when the disease is somewhat advanced the milk decreases and finally disappears, yet, in the incipient stages, the milk is doubtless unwholesome, though often innocently vended by the owner of the cattle.

The secretion of milk is affected in quality and quantity by the nature of the food to a wonderful degree. It acquires a peculiar taint from turnips or cabbages, a nauseous flavour from the decaying leaves of trees, a bitterness from a variety of plants, and a peculiar waterishness and deficiency in nutritive qualities from the brewers' grains and distillers' wash, which form so great a portion of the food of London cows.

It is a certain fact that disease has the same effect in imparting a hurtful quality to the milk of cows, as it unquestionably has in the human subject. And if a mother naturally objects to selecting a wet-nurse for her infant of an unhealthy constitution, she should equally be careful in purchasing milk from cows properly fed and unaffected with disease, especially of the lungs.

That boiling will obviate the ill qualities in cows' milk is probable; but then much of it is taken in the form of new milk by invalids, so that what is sought for as a means of restoration to health, becomes only a source of greater disease.

VII.—The Present State of Public Feeling as well as of Knowledge.

Up to the present date (October, 1857), little has occurred varying from those facts which have been fully related in this essay. The disease has increased no further than it generally does during the autumn months. It has appeared as a local attack in several districts, but has not caused a greater general alarm. The feeling of alarm, indeed, amongst the consumers as well as the breeders of cattle has subsided, rather than otherwise. I will, therefore, under this heading, merely sum up the known facts relative to the cattle murrain. And I abridge these from the well-written report of Dr. Greenhow on the cattle murrain, to whose work, to Mr. Youatt's on cattle, and to various articles in the public papers, I owe most of the information in this essay.

I. 1. The cattle disease is not of recent origin, but has prevailed in the United Kingdom for the last fifteen or sixteen years.

2. It is not peculiar to London, but prevalent also in country districts, among pastured as well as stall-fed cattle.

3. It is probably infectious, but also developed spontaneously in consequence of some unknown peculiarities of breed, management, season, or locality, and is not supposed to have been imported into the United Kingdom.

4. It is identical with the *lungenseuche*, or pulmonary murrain, now or lately prevailing in Mecklenburg, Holstein, and other continental countries.

5. It has no affinity with the disease of *rinder-pest*, or steppe murrain, with which some writers of this country have confounded it.

II. 1. Steppe murrain is probably more contagious than pulmonary murrain, and is said only to originate spontaneously among cattle of the Podolian breed, and in the steppe countries of Southern Russia.

2. Steppe murrain is probably at present not more than usually prevalent in the south-eastern countries of Europe, and has, on former occasions, often prevailed more extensively than now in Austria and Prussia.

3. The only probable chance of the importation of steppe murrain into the United Kingdom is by way of Prussia. It

has recently shown itself in a few places only on the eastern frontier of that country, and has in each case been speedily exterminated by the active measures adopted by the authorities to secure its extinction.

4. The regulations enforced by the authorities to exclude steppe murrain from the Prussian territory, and to extinguish it when it is imported thither, are of so stringent a character as to render its introduction into the United Kingdom by the way of Prussia unlikely.

5. Any measures which it may be considered necessary to adopt for the exclusion of this disease from the United Kingdom must necessarily be of a permanent, and not of a merely temporary character, as steppe murrain is more or less prevalent in countries adjoining to the eastern frontiers of Austria and Prussia. Perhaps the case would be satisfactorily met if the importation of cattle were prohibited, except from countries which, as regards steppe murrain, have clean bills of health, and require similarly clean bills from other countries importing to them.

III. Meat derived from animals suffering from pulmonary murrain, and probably with other diseases, is commonly and extensively sold, both in London and elsewhere, for human food.

IV. 1. There is no satisfactory proof that the consumption of meat derived from diseased cattle has, in this country, been productive of direct injurious consequences upon those who have eaten it.

2. There are reasons for supposing that the use of meat from animals suffering from diseases unknown among the cattle of the United Kingdom, has abroad frequently been attended with serious consequences on human health.

3. The consumption of meat undergoing decomposition has frequently been injurious, and such meat cannot be eaten with safety even when cooked.

THE END.

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